

**REPORT NUMBER: NCAP-CAL-13-017**

**NEW CAR ASSESSMENT PROGRAM (NCAP)  
FRONTAL BARRIER IMPACT TEST**

**General Motors LLC  
2013 Chevrolet Traverse  
Four Door SUV**

**NHTSA No: MD0117**

**PREPARED BY:  
CALSPAN CORPORATION  
P.O. BOX 400  
BUFFALO, NEW YORK 14225**



**March 8, 2013**


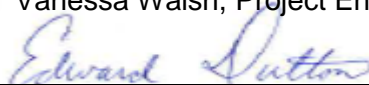
**FINAL REPORT**

**PREPARED FOR:  
U. S. DEPARTMENT OF TRANSPORTATION  
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION  
OFFICE OF CRASHWORTHINESS STANDARDS  
1200 NEW JERSEY AVE SE, ROOM W43-410  
WASHINGTON, D.C. 20590**

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Administration, in response to Contract Number DTNH22-12-D-00260.

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**FINAL REPORT ACCEPTANCE BY OCWS:**

\_\_\_\_\_  
Division Chief, New Car Assessment Program  
NHTSA, Office of Crashworthiness Standards

Date: \_\_\_\_\_

\_\_\_\_\_  
COTR, New Car Assessment Program  
NHTSA, Office of Crashworthiness Standards

Date: \_\_\_\_\_



# **TECHNICAL REPORT DOCUMENTATION PAGE**

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<b>4. Title and Subtitle</b> Final Report of New Car Assessment Program Frontal Impact Testing of a 2013 Chevrolet Traverse four door SUV NHTSA No.: MD0117				<b>5. Report Date</b> March 8, 2013																																																					
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<b>15. Supplementary Notes</b>																																																									
<b>16. Abstract</b> <p>A 56.30 km/h (35 mph), NCAP Frontal Impact Test was conducted on a 2013 Chevrolet Traverse four door SUV in accordance with the specifications of the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and foot well intrusion performance. The test was conducted at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on January 31, 2013.</p> <p>The impact velocity of the vehicle was 56.36 km/h, and the ambient temperature at the barrier face at the time of impact was -2°C. The target vehicle's maximum post-test static crush was 538 mm at the vehicle's centerline. The test vehicle's occupant performance data is as follows:</p> <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th rowspan="2">Units</th> <th colspan="2">Driver ATD (Serial No. 061)</th> <th colspan="2">Passenger ATD (Serial No. 273)</th> </tr> <tr> <th>Threshold</th> <th>Result</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC<sub>15</sub>)</td> <td></td> <td>700</td> <td>199.50</td> <td>700</td> <td>276.92</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>-22.69</td> <td>52</td> <td>-13.55</td> </tr> <tr> <td>Nij</td> <td></td> <td>1</td> <td>0.29</td> <td>1</td> <td>0.34</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4,170</td> <td>1,627.35</td> <td>2,620</td> <td>836.58</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4,000</td> <td>-276.58</td> <td>2,520</td> <td>-225.88</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10,008</td> <td>-2,852.09</td> <td>6,805</td> <td>-985.15</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10,008</td> <td>-1747.26</td> <td>6,805</td> <td>-1244.62</td> </tr> </tbody> </table>						Measurement Description	Units	Driver ATD (Serial No. 061)		Passenger ATD (Serial No. 273)		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC <sub>15</sub> )		700	199.50	700	276.92	Maximum Chest Compression	mm	63	-22.69	52	-13.55	Nij		1	0.29	1	0.34	Neck Tension	N	4,170	1,627.35	2,620	836.58	Neck Compression	N	4,000	-276.58	2,520	-225.88	Left Femur Force	N	10,008	-2,852.09	6,805	-985.15	Right Femur Force	N	10,008	-1747.26	6,805	-1244.62
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## **SECTION 1**

### **PURPOSE AND SUMMARY OF TEST**

#### **PURPOSE**

This 56.3 km/h frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-12-D-00260. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for consumer information purposes.

The 56.3 km/h frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Frontal NCAP Laboratory Test procedure, dated September 2012.

#### **SUMMARY**

A load cell barrier consisting of 36 load cells was impacted by a 2013 Chevrolet Traverse four door SUV at a velocity of 56.36 km/h. The test was performed at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on January 31, 2013. Pre- and post-test photographs of the vehicle and dummies to document the test can be found in Appendix A. One real-time camera and 16 high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in Data Sheet 6 of this report.

One Part 572E, 50<sup>th</sup> percentile male anthropomorphic test device (ATD), was placed in the driver seating position and one Part 572O 5<sup>th</sup> percentile female ATD was placed in the right-front passenger according to dummy placement instructions specified in the Frontal NCAP Laboratory Test Procedure. Both ATDs were fully instrumented with head, chest and pelvis tri-axial accelerometers, chest displacement potentiometers, upper neck transducers, right / left femur load cells, and lower leg instrumentation. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 061) and the right-front passenger (position 2) ATD (Serial No. 273) were calibrated previous to this test. Certification details, along with instrumentation calibration data, can be found in Appendix C of this report.

The 136 channels of data were recorded on an on-board data acquisition system. Please refer to Appendix B for the dummy response data traces.

There was 100% percent windshield retention and no intrusion into the protected zone of the windshield during the event. There was a total of 0.0 grams of stoddard solvent leakage after the event and including all phases of the static rollover. The maximum static crush of the test vehicle was 538 mm at the vehicle's centerline. During and after the impact event, the driver's side door remained closed and operational and the passenger's side door remained closed and operational.

The driver's visible contact points were as follows: The driver's head contacted the frontal airbag and then the head restraint. The upper torso contacted the frontal airbag. Both knees contacted the knee bolster.

The passenger's visible contact points were as follows: The passenger's head contacted the frontal airbag and then the head restraint. The upper torso contacted the frontal airbag. Both knees contacted the glovebox.

The occupant data is summarized below.

ATD Position	HIC <sub>15</sub>	Nij	Neck Tension (N)	Neck Comp. (N)	3ms Chest Clip (Gs)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver (50 <sup>th</sup> )	199.50	0.29	1,627.35	-276.58	40.90	-22.69	-2,852.09	-1,747.26
Passenger (5 <sup>th</sup> )	276.92	0.34	836.58	-225.88	40.91	-13.55	-985.15	-1,244.62

#### GENERAL COMMENTS:

1. P1 (Driver) serial number - 061
2. P2 (Passenger) serial number - 273

#### Data Anomalies:

V1P1 UPPER NECK FY has a spike at 277 ms  
V1P1 LEFT FOOT AFT X has a spike at 39.3 ms  
V1P1 LEFT FOOT FORE Z has a spike at 39.3 ms  
V1P1 RIGHT FOOT AFT X has a spike at 35.7 & 54.4 ms  
V1P1 RIGHT FOOT FORE Z has a spike at 53.9 ms  
V1P2 LEFT FOOT AFT Z has a spike at 39.7 ms  
V1P2 LEFT FOOT FORE Z has a spike at 39.7 ms

## **SECTION 2**

### **OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS**

This section contains information reporting for the following Data Sheets:

Data Sheet No. 1 – General Test and Vehicle Parameter Data

Data Sheet No. 2 – Seat Adjustment, Fuel System, and Steering Wheel Data

Data Sheet No. 3 – Dummy Longitudinal Clearance Dimensions

Data Sheet No. 4 – Dummy Lateral Clearance Dimensions

Data Sheet No. 5 – Seat Belt Positioning Data

Data Sheet No. 6 – High-Speed Camera Locations and Data

Data Sheet No. 7 – Vehicle Accelerometer Locations

Data Sheet No. 8 – Photographic Reference Target Locations

Data Sheet No. 9 – Load Cell Locations on Fixed Barrier

Data Sheet No. 10 – Test Vehicle Summary of Results

Data Sheet No. 11 – Post-Test Observations

Data Sheet No. 12 – Vehicle Profile Measurements

Data Sheet No. 13 – Accident Investigation Division Data

Data Sheet No. 14 – Vehicle Intrusion Measurements

Data Sheet No. 15 – Summary of FMVSS 212, 219 (Partial), and 301 Data

Data Sheet No. 16 – FMVSS 301 Static Rollover Results

Data Sheet No. 17 – Dummy/Vehicle Temperature Stabilization Chart

**DATA SHEET NO. 1**  
**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0117  
 Test Date: 1/31/2013

**TEST VEHICLE INFORMATION AND OPTIONS**

NHTSA No.	MD0117
Model Year	2013
Make	Chevrolet
Model	Traverse
Body Style	Four Door SUV
VIN	1GNKVGKD9DJ105954
Body Color	Charcoal gray
Odometer Reading (km /mi)	244.6 / 152.0
Engine Displacement (L)	3.6
Type / No. Cylinders	V6
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	6-Speed
Overdrive	Yes
Final Drive	All Wheel Drive
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes
Automatic Door Locks (ADLs)	Yes

Traction Control System (TCS)	Yes
Power Steering	Yes
Power Window Auto-Reverse	No
Driver Frontal Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	No
Front Pass. Frontal Airbag	Yes
Front Pass. Curtain Airbag	Yes
Front Pass. Head/Torso Airbag	No
Front Pass. Torso Airbag	No
Front Pass. Torso/Pelvis Airbag	Yes
Front Pass. Pelvis Airbag	No
Front Pass. Knee Airbag	No
Driver Pretensioner	Yes
Driver Load Limiter	Yes
Front Pass. Pretensioner	Yes
Front Pass. Load Limiter	Yes
Front Center Airbag	Yes

Does owner's manual provide instructions to turn off automatic door locks?

No

**DATA FROM CERTIFICATION LABEL**

Manufactured By	General Motors LLC
Date of Manufacture	10/12

GVWR (kg)	2,930
GAWR Front (kg)	1,450
GAWR Rear (kg)	1,600

**VEHICLE SEATING AND WEIGHT CAPACITY DATA**

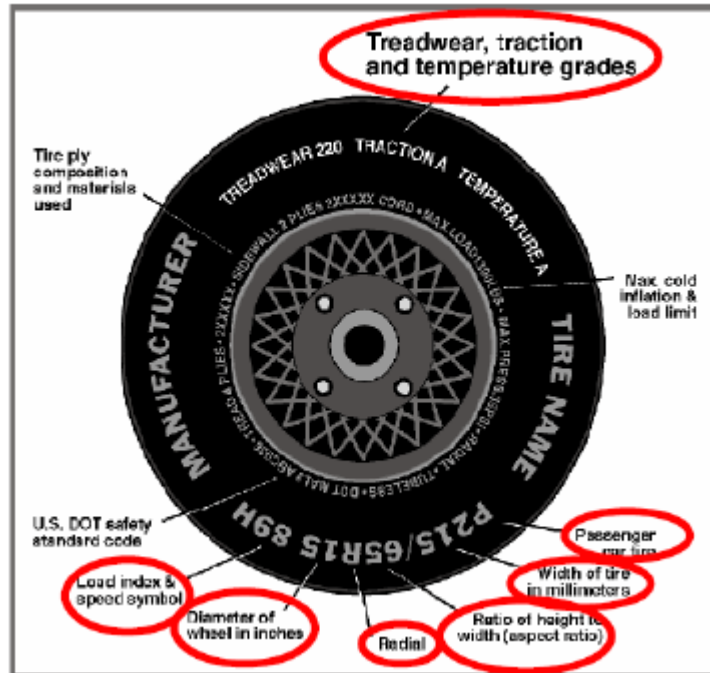
Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench	Split Bench	
Number of Occupants	2	3	3	8
Capacity Wt. (VCW) (kg)				692.0
Cargo Wt. (RCLW) (kg)				136.0

**DATA SHEET NO. 1 ... (CONTINUED)**  
**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0117  
 Test Date: 1/31/2013

Collect items circled in red, tire manufacturer, and tire name.



**VEHICLE TIRE INFORMATION**

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	240	240
Recommended Tire Size	P255/65R18	P255/65R18
Tire Size on Vehicle	P255/65R18	P255/65R18
Tire Manufacturer	Goodyear	Goodyear
Tire Model	Fortera	Fortera
Treadwear	540	540
Traction	A	A
Temperature Grades	B	B
Tire Plies Sidewall	2 Polyester Cord	2 Polyester Cord
Tire Plies Body	2 Polyester Cord, 2 Steel	2 Polyester Cord, 2 Steel
Load Index / Speed Symbol	109S	109S
Tire Material	RUBBER	RUBBER
DOT Safety Code Left	4BXMARDR4212	4BXMARDR4212
DOT Safety Code Right	4BXMARDR4212	4BXMARDR4212

**DATA SHEET NO. 1 ... (CONTINUED)**  
**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0117  
 Test Date: 1/31/2013

**TEST VEHICLE WEIGHTS**

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	623.0	493.0		646.0	610.0	
Right	kg	614.0	492.5		643.5	592.5	
Ratio	%	55.7	44.3		51.7	48.3	
Totals	kg	1,237.0	985.5	2,222.5	1,289.5	1,202.5	2,492.0

**TARGET TEST WEIGHT CALCULATION**

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	2,222.5	(A)
Weight of 1 P572E ATD & 1 P572O ATD	kg	140.6	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	136.0	(C)
Calculated Vehicle Target Weight (TVTW)	kg	2499.1	(A+B+C)

**TEST VEHICLE ATTITUDES AND CG**

Condition	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	868	871	889	896	1,341
As Tested	mm	864	868	860	861	1,459
Post-Test	mm	902	901	874	868	

**GENERAL TEST VEHICLE DATA**

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	3,024
Total Vehicle Length at Left Side	mm	5,071
Total Vehicle Length at Centerline	mm	5,171
Total Vehicle Length at Right Side	mm	5,069
Weight of Ballast in Cargo Area	kg	125.5
Weight of Vehicle Components Removed	kg	34.1
Amount of Stoddard Solvent in Fuel Tank	L	76.4

**LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT:**

Third row seats & trunk carpeting were removed.



**DATA SHEET NO.1 ... (CONTINUED)**  
**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0117  
 Test Date: 1/31/2013

**TARGET VEHICLE STRUCTURAL MEASUREMENT**

No.	Description	Pre-Test
1	Total Length	5,171
2	Total Width	1,958
3	Bumper Top Height	-686
4	Bumper Bottom Height	-562
5	Longitudinal Member Top Height	-649
6	Distance Between Longitudinal Members	1,093
7	Longitudinal Member Width	94
8	Engine Top Height	-1,066
9	Engine Bottom Height	-205
10	Engine and Gearbox Width	622
11	Front Bumper-Engine Distance	610
12	Front Shock Absorber Fixing Height	-1,016
13	Bonnet Leading Edge Height	-963
14	Front Shock Absorber Fixing Width	1318
15	Front Bumper – Front Axle Distance	1,010
16	Front Axle – A Pillar Distance	530
17	A-Pillar – B-Pillar Distance	1,097
18	B-Pillar – Rear Axle Distance	1,398
19	B-Pillar – C-Pillar Distance	984
20	Roof Sill Bottom Height	-1,585
21	Roof Sill Top Height	-1,712
22	Floor Sill Bottom Height	-444
23	Floor Sill Top Height	-486

\*All measurements are in millimeters

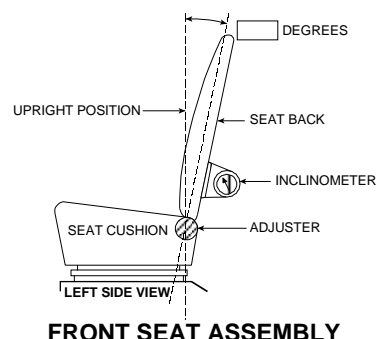
## DATA SHEET NO. 2 SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV  
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0117  
Test Date: 1/31/2013

### NOMINAL DESIGN RIDING POSITION

The driver's seat back was set to the manufacturer's designated angle. The passenger's seat back was positioned in a similar manner as the driver's seat back. Seat back angles are measured at the headrest post bezel using a digital inclinometer.



Seating Position	Degrees
Driver Seat Back Angle	3.0
Passenger Seat Back Angle	-2.1

### SEAT FORE / AFT POSITIONS

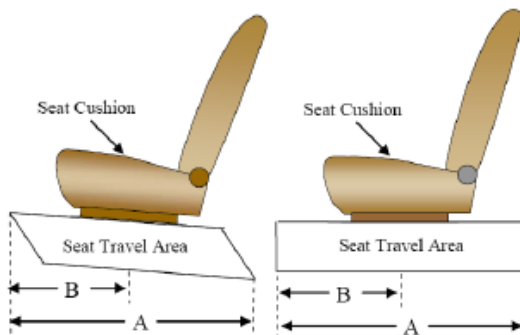
The driver's seat was positioned at the mid-point of fore/aft travel. The passenger's seat was positioned at the most forward position of fore/aft travel. Zero is defined as the forward most position.

Seating Position	Total Fore / Aft Travel	Placed in Position #
Driver Seat	248	124
Passenger Seat	240	0

### SEAT BELT UPPER ANCHORAGE

The driver's seat belt anchorage was positioned according to the manufacturer's designated positioning for a 50<sup>th</sup> percentile adult male ATD. The passenger's seat belt anchorage was positioned according to the manufacturer's designated positioning for a 5<sup>th</sup> percentile adult female ATD. For this test zero is defined as the uppermost position.

Seating Position	Total # of Positions	Placed in Position #
Driver Seat	5	0
Passenger Seat	5	0



**DATA SHEET NO. 2 ... (CONTINUED)**  
**SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA**

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV  
 Test Program: NCAP Frontal Barrier Impact Test

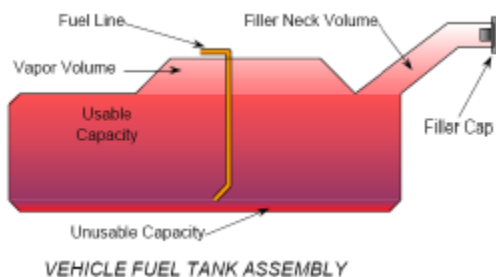
NHTSA No.: MD0117  
 Test Date: 1/31/2013

**FUEL TANK CAPACITY**

Description	Liters
Usable Capacity of "Standard Tank"	82.1
Usable Capacity of "Optional Tank"	
92%-94% of Usable Capacity	75.6 - 77.2
Actual Amount of Solvent Used	76.4
1/3 of Usable Capacity	27.4

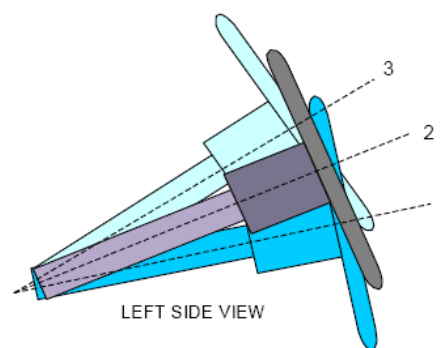
**FUEL PUMP**

The vehicle is equipped with an electric fuel pump. The fuel filler neck is on the left side of the vehicle. The pump creates positive pressure in the fuel lines, pushing the gasoline to the engine. See form 1 for more information.



**STEERING COLUMN ADJUSTMENT**

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. For angular measurements, a digital inclinometer was used to measure a plate which was placed across the steering wheel rim. A tape measure was used to measure the telescoping steering wheel travel.



STEERING COLUMN ASSEMBLY

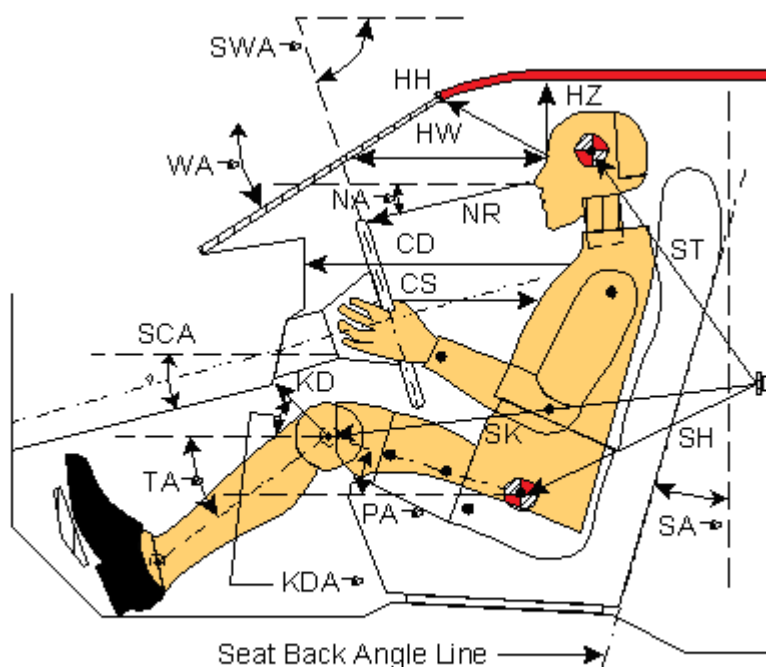
**STEERING COLUMN POSITIONS**

Description	Degrees	Fore / Aft Position (mm)
Lowermost position No. 1	17.6	0
Geometric center position No. 2	20.7	26
Uppermost position No. 3	23.7	52
Telescoping Steering Wheel Travel		52
Test Position	20.7	26

### DATA SHEET NO. 3 DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV  
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0117  
Test Date: 1/31/2013



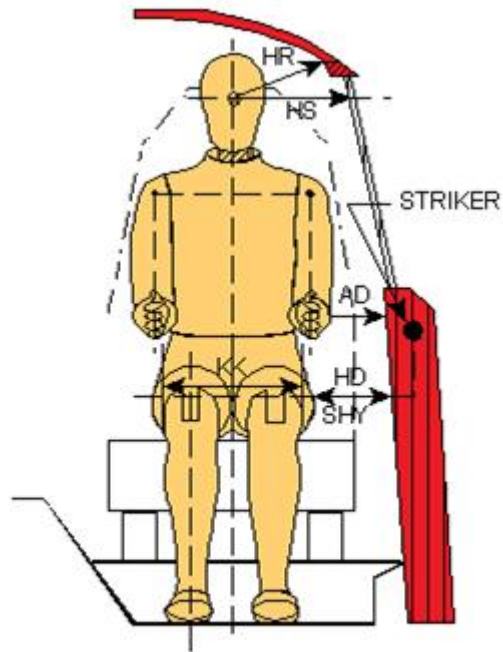
Left Side View

Code	Measurement Description	Driver (SN: 061)		Passenger (SN: 273)	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		29.0		
SWA°	Steering Wheel Angle		20.8		
SCA°	Steering Column Angle		69.2		
SA°	Seat Back Angle (on headrest post)		3.0		-2.1
HZ	Head to Roof (Z)	262	90.0	264	90.0
HH	Head to Header	526	22.1	392	38.9
HW	Head to Windshield	829	0.0	725	0.0
NR	Nose to Rim	455	-10.1	491	-25.8
CD	Chest to Dash	623		440	
CS	Chest to Steering Hub	381	-4.8		
RA	Rim to Abdomen	242	0.0		
KDL	Left Knee to Dash	228	27.3	133	33.9
KDR	Right Knee to Dash	224	29.6	131	32.3
PA°	Pelvic Angle		24.0		19.8
TA°	Tibia Angle		-28.5		-40.3
SK	Striker to Knee	560	3.0	696	2.0
ST	Striker to Head	608	88.2	611	66.8
SH	Striker to H-Point	183	-17.8	363	-2.4

**DATA SHEET NO. 4**  
**DUMMY LATERAL CLEARANCE DIMENSIONS**

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0117  
 Test Date: 1/31/2013



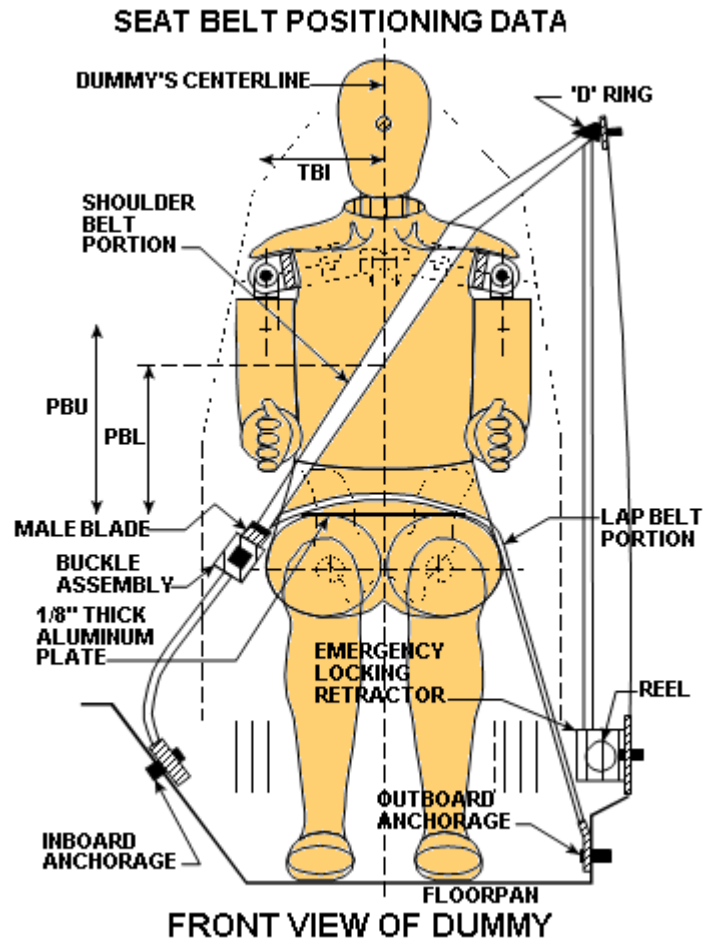
**Front View**

Code	Description	Driver (mm)	Passenger (mm)
<b>AD</b>	Arm to Door	159	67
<b>HD</b>	H-Point to Door	149	200
<b>HR</b>	Head to Side Header	238	282
<b>HS</b>	Head to Side Window	375	393
<b>KK</b>	Knee to Knee	300	165
<b>SHY</b>	Striker to H-Point (Y Direction)	265	295
<b>AA</b>	Ankle to Ankle	303	165

## DATA SHEET NO. 5 SEAT BELT POSITIONING DATA

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV  
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0117  
Test Date: 1/31/2013



### SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
<b>PBU</b> — Top surface of reference to belt upper edge	mm	380	340
<b>PBL</b> — Top surface of reference to belt lower edge	mm	310	275

### BELT LENGTH DATA

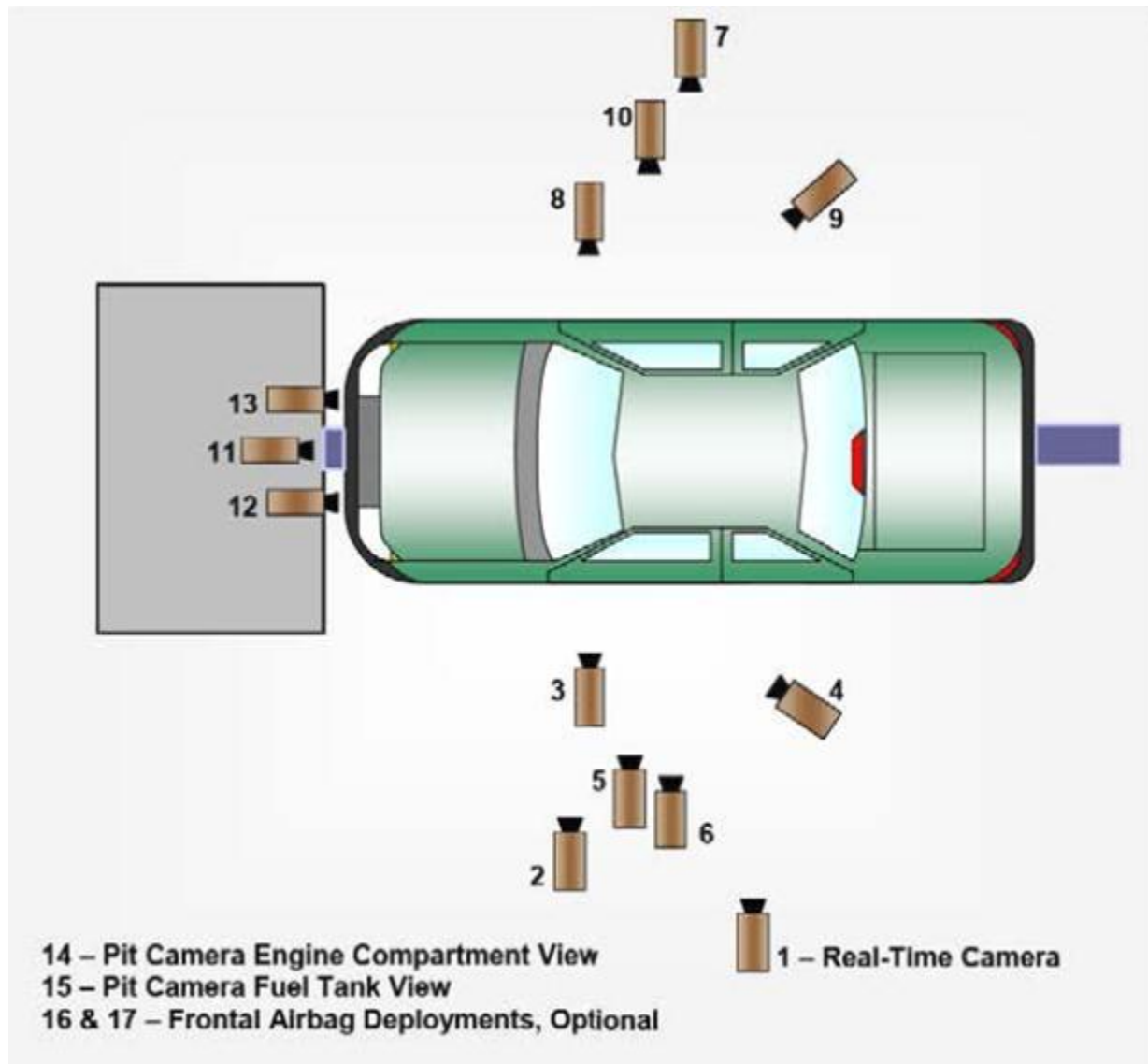
Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	807	918
Lap Belt Length as measured on ATD	mm	520	545
Remainder of belt on reel	mm	753	617
Total belt length for continuous webbing systems	mm	2,080	2,080

**DATA SHEET NO. 6**  
**HIGH-SPEED CAMERA LOCATIONS AND DATA**

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV  
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0117  
Test Date: 1/31/2013

**CAMERA POSITIONS FOR FRONTAL IMPACTS**



Top View

**DATA SHEET NO. 6 ... (CONTINUED)**  
**HIGH-SPEED CAMERA LOCATIONS AND DATA**

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0117  
 Test Date: 1/31/2013

**CAMERA LOCATIONS**

No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall	--	--	--		24
2	Driver Close-Up	1794	-7892	1173	50	1000
3	Left Front Half	1264	-9815	1114	50	1000
4	Left Angle	3045	-3158	2326	24	1000
5	Steering Column - Top	2084	-8515	1825	28 - 70	1000
6	Steering Column - Bottom	2084	-8515	1191	24 - 70	1000
7	Right Overall	1899	7824	1146	24	1000
8	Passenger Close-Up	1774	8343	1401	50	1000
9	Right Front Half	1485	9513	978	50	1000
10	Right Angle	2975	2971	2183	28	1000
11	Windshield	480	0	3219	20	1000
12	Driver Windshield	260	-602	2012	12.5	1000
13	Passenger Windshield	260	583	1971	12.5	1000
14	Pit Front	779	0	1861	6.5	1000
15	Pit Rear	2095	0	1841	6.5	1000
16	Onboard Driver Airbag (Optional)					
17	Onboard Passenger Airbag (Optional)					

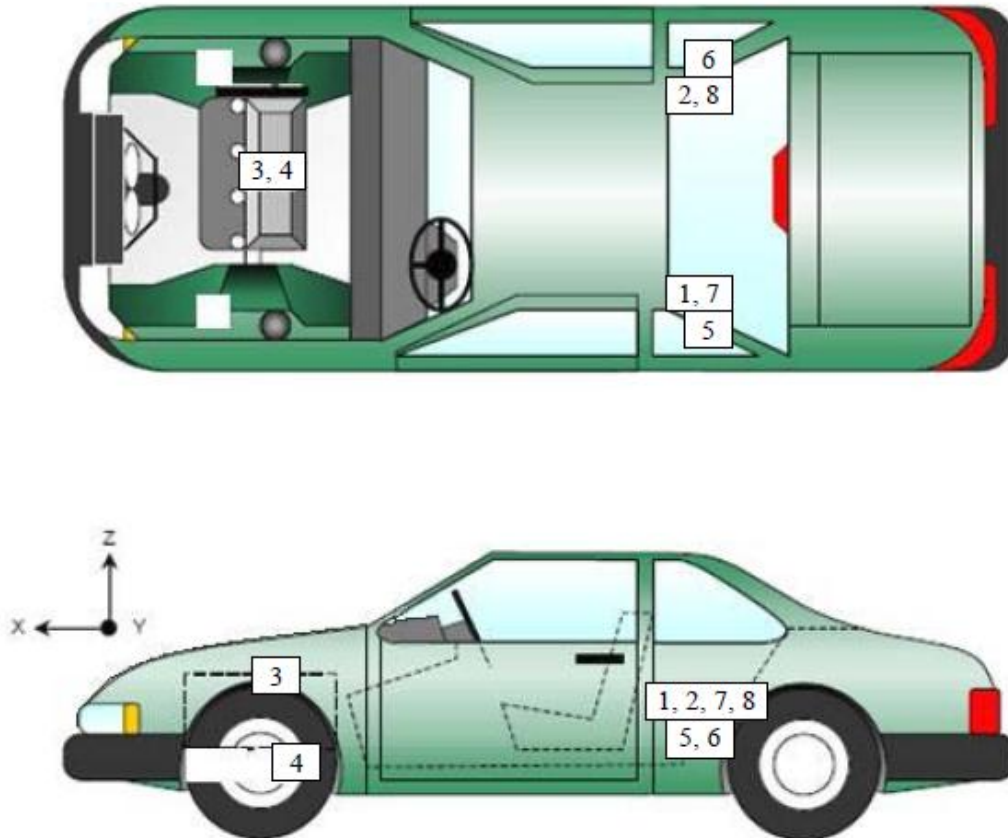
\* COORDINATES:      +X = forward of impact plane  
                              +Y = right of monorail center  
                              +Z = into ground



# **DATA SHEET NO. 7** **VEHICLE ACCELEROMETER LOCATIONS**

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0117  
 Test Date: 1/31/2013



## **VEHICLE ACCELEROMETER PRE-TEST LOCATIONS**

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Accelerometer – X Direction	1,930	-709	-457
2	Right Rear Accelerometer – X Direction	1,973	701	-459
3	Engine Top X	4,452	144	-860
4	Engine Bottom X	4,426	-8	205
5	Left Rear Accelerometer – Z Direction	1,930	-709	-457
6	Right Rear Accelerometer – Z Direction	1,973	701	-459
7	Left Rear Accelerometer – X Direction Redundant	1,930	-709	-457
8	Right Rear Accelerometer – X Direction Redundant	1,973	701	-459

Reference Points:      *X – Rear Surface of Vehicle (+ forward)*  
                                  *Y – Vehicle Centerline (+ to right)*  
                                  *Z – Ground Plane (+ down)*

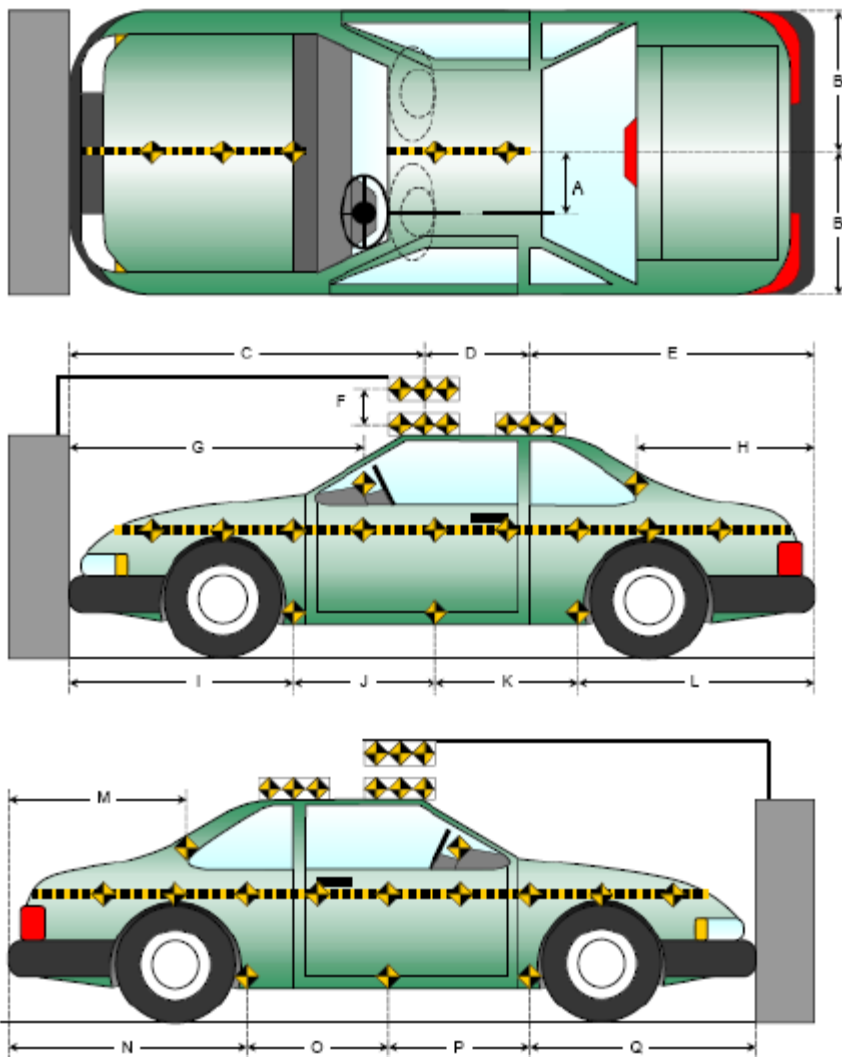
# **DATA SHEET NO. 8** **PHOTOGRAPHIC REFERENCE TARGET LOCATIONS**

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0117  
 Test Date: 1/31/2013

Item	Value
A	396
B	979
C	2,323
D	913
E	1,935
F	111
G	1,862
H	1,569
I	1,516
J	1,024
K	1,028
L	1,603
M	1,566
N	1,604
O	1,021
P	1,027
Q	1,518

All units in millimeters



# **DATA SHEET NO. 9** **LOAD CELL LOCATIONS ON FIXED BARRIER**

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0117  
 Test Date: 1/31/2013

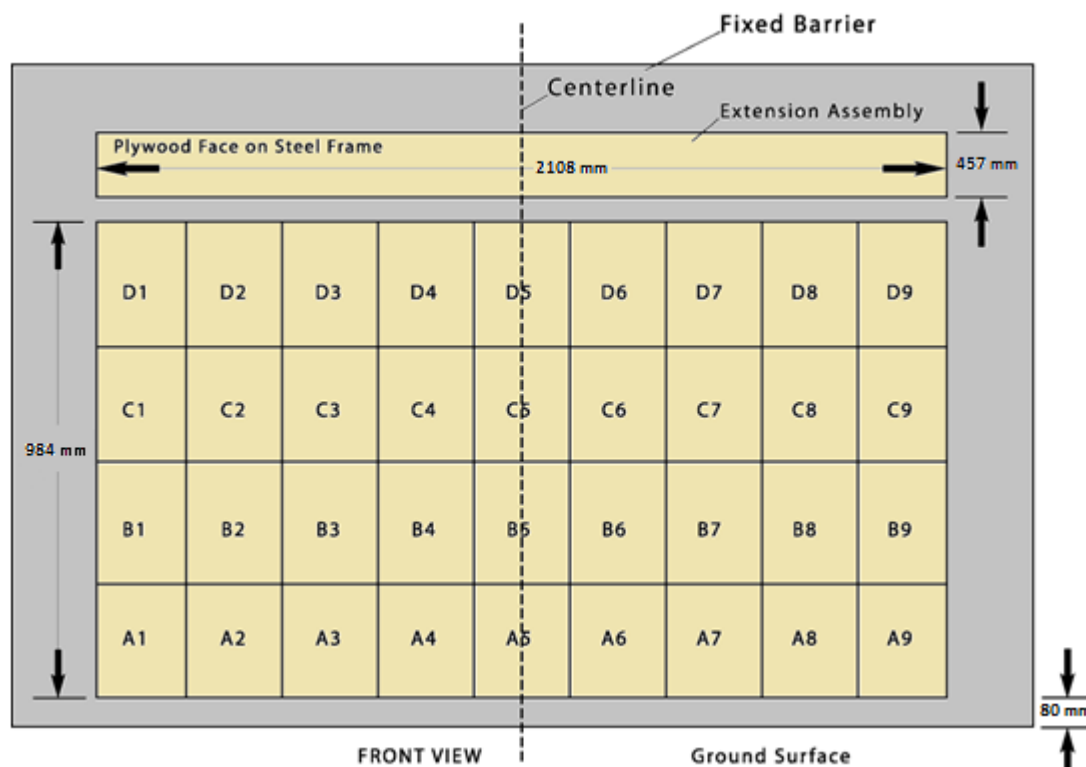


Figure 1 - Load Cell Locations on a 36-Load Cell Barrier with Plywood Height Extension

**DATA SHEET NO. 10**  
**TEST VEHICLE SUMMARY OF RESULTS**

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV  
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0117  
Test Date: 1/31/2013

**INSTRUMENTATION**

Instrumentation	Number of Channels Collected
Driver Dummy Accelerometers	46
Passenger Dummy Accelerometers	46
Vehicle Structure Accelerometers	8
Load Cell Barrier	36
<b>Total</b>	<b>136</b>

**CAMERA COVERAGE**

Type of Camera	Number Used in this Test
High-Speed Vehicle Onboard	0
High-Speed Offboard	14
Real-Time Panning	1
<b>Total</b>	<b>15</b>

**DATA SHEET NO. 11  
POST-TEST OBSERVATIONS**

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV  
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0117  
Test Date: 1/31/2013

**TEST DUMMY INFORMATION AND CONTACT LOCATIONS**

Description	Driver	Passenger
Dummy Type / Serial No.	P572E 50 <sup>TH</sup> male / 061	P5720 5 <sup>th</sup> female / 273
Head Contact	Front Airbag & Headrest	Front Airbag & Headrest
Upper Torso Contact	Front airbag	Front airbag
Lower Torso Contact	None	None
Left Knee Contact	Knee Bolster	Glovebox
Right Knee Contact	Knee Bolster	Glovebox

**DOOR OPENING AND SEAT TRACK INFORMATION**

Description	Driver	Passenger
Locked / Unlocked Doors	Unlocked	Unlocked
Front Door Opening	Closed & Operational	Closed & Operational
Rear Door Opening	Closed & Operational	Closed & Operational
Seat Track Shift (mm)	0	0
Seat Back Failure	No	No
Glazing Damage	None	None

**POST-TEST STRUCTURAL OBSERVATIONS**

Critical Areas of Performance	Observations and Conclusions
Windshield Damage	Cracks prominent on Passenger side, caused by airbag deployment
Window Damage	None
Other Notable Effects	None

**VEHICLE REBOUND FROM BARRIER**

Measured Parameter	Units	Value
Left Side	mm	727
Center	mm	637
Right Side	mm	649
Average	mm	671

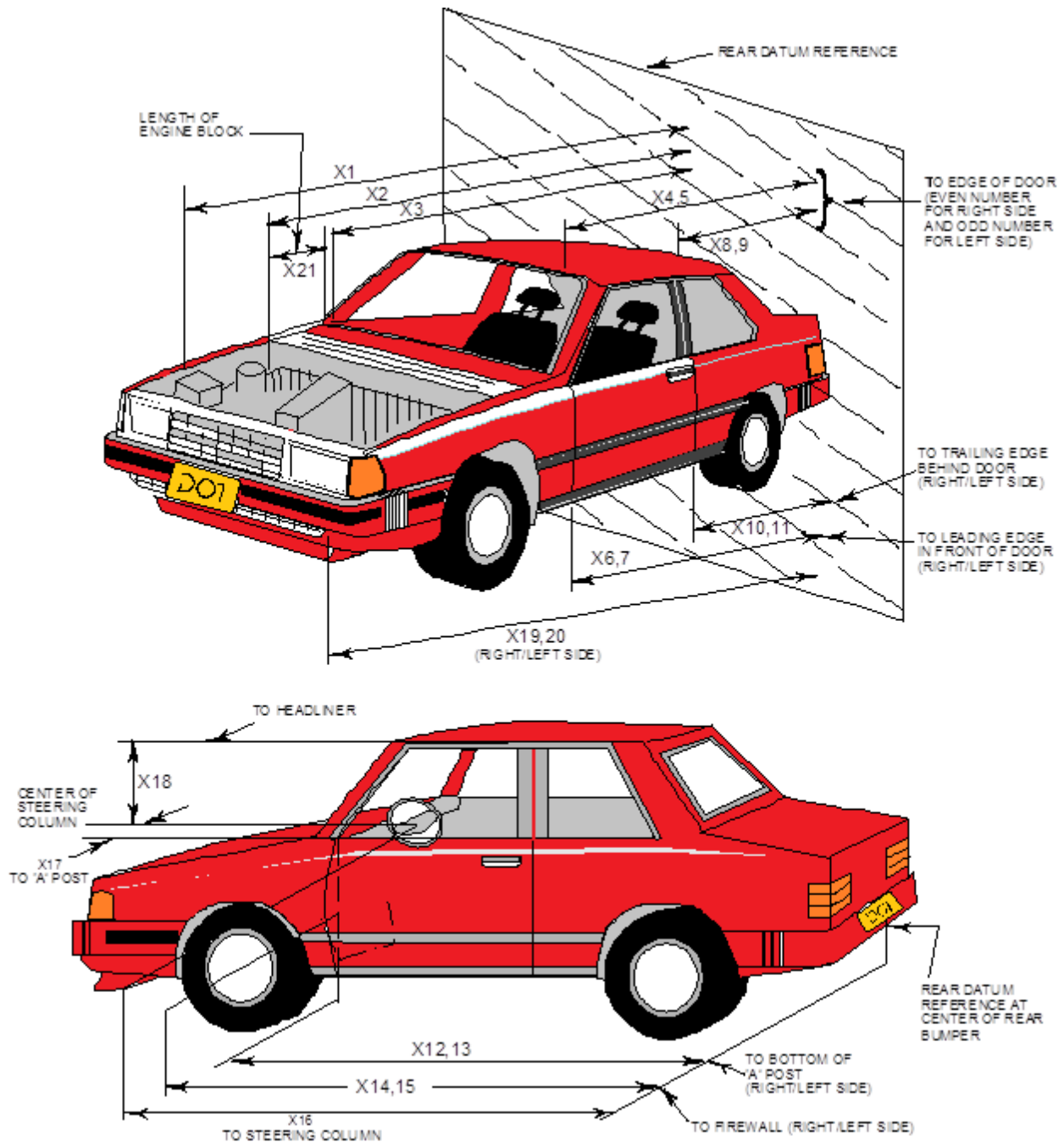
**SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION**

Restraint Type	Driver		Passenger	
	Installed	Deployed	Installed	Deployed
Front Airbag	Yes	Yes	Yes	Yes
Side Airbag 1 - Curtain	Yes	No	Yes	No
Side Airbag 2 - Torso/Pelvis	Yes	No	Yes	No
Side Airbag 2 - Front Center Airbag	Yes	No	No	NA
Knee Airbag	No	NA	No	NA
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other				

# **DATA SHEET NO. 12** **VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0117  
 Test Date: 1/31/2013



**DATA SHEET NO. 12 ... (CONTINUED)**  
**VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0117  
 Test Date: 1/31/2013

No.	Measurement Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	5,171	4,631	-538
2	Rear Surface of Vehicle (RSOV) to Front of Engine	4,561	4,324	-237
3	RSOV to Firewall	4,231	4,216	-15
4	RSOV to Upper Leading Edge of Right Door	3,627	3,626	-1
5	RSOV to Upper Leading Edge of Left Door	3,628	3,629	1
6	RSOV to Lower Leading Edge of Right Door	3,621	3,622	1
7	RSOV to Lower Leading Edge of Left Door	3,623	3,624	1
8	RSOV to Upper Trailing Edge of Right Door	2,534	2,533	-1
9	RSOV to Upper Trailing Edge of Left Door	2,536	2,537	1
10	RSOV to Lower Trailing Edge of Right Door	2,550	2,549	-1
11	RSOV to Lower Trailing Edge of Left Door	2,550	2,550	0
12	RSOV to Bottom of "A" Post of Right Side	3,724	3,723	-1
13	RSOV to Bottom of "A" Post of Left Side	3,727	3,727	0
14	RSOV to Firewall, Right Side	4,148	4,139	-9
15	RSOV to Firewall, Left Side	4,153	4,147	-6
16	RSOV to Steering Column	3,154	3,199	45
17	Center of Steering Column to "A" Post	299	295	-4
18	Center of Steering Column to Headliner	462	475	13
19	RSOV to Right Side of Front Bumper	5,069	4,683	-386
20	RSOV to Left Side of Front Bumper	5,071	4,564	-507
21	Length of Engine Block	399	399	0
RD	RSOV to Right Side of Dash Panel	3,356	3,356	0
CD	RSOV to Center of Dash Panel	3,343	3,342	-1
LD	RSOV to Left Side of Dash Panel	3,358	3,359	1

All Dimensions in mm

**DATA SHEET NO. 13**  
**ACCIDENT INVESTIGATION DIVISION DATA**

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0117  
 Test Date: 1/31/2013

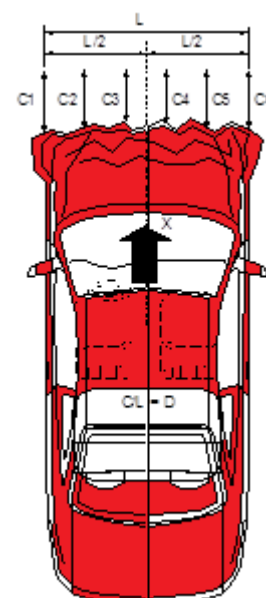
**VEHICLE INFORMATION**

VIN: 1GNKVGKD9DJ105954  
 Vehicle Size Category: Passenger

Wheelbase (mm): 3,024  
 Test Weight (kg): 2,492.0

**ACCELEROMETER DATA**

Accelerometer Locations: Please See Data Sheet No. 7  
 Cal. Procedure / Interval: Calspan Procedure / 6 month  
 Integration Algorithm: Trapezoidal  
 Linearity: > 99%  
 Impact Velocity (km/h): 56.36  
 Velocity Change (km/h): 56.36  
 Time of Separation (ms): 139



**CRUSH PROFILE**

Collision Deformation Classification: 12FDEW2  
 Midpoint of Damage: Vehicle Centerline  
 Damage Region Length (mm): 1,152  
 Impact Mode: Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush Zone 1 at Left Side	mm	5,034	4,601	-433
C2	Crush Zone 2 at Left Side	mm	5,100	4,615	-485
C3	Crush Zone 3 at Left Side	mm	5,153	4,663	-490
C4	Crush Zone 4 at Right Side	mm	5,152	4,695	-457
C5	Crush Zone 5 at Right Side	mm	5,098	4,704	-394
C6	Crush Zone 6 at Right Side	mm	5,032	4,726	-306
L	C1 to C6	mm	1,152	1,160	8



**DATA SHEET NO. 14**  
**VEHICLE INTRUSION MEASUREMENTS**

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV  
 Test Program: NCAP Frontal Barrier Impact Test

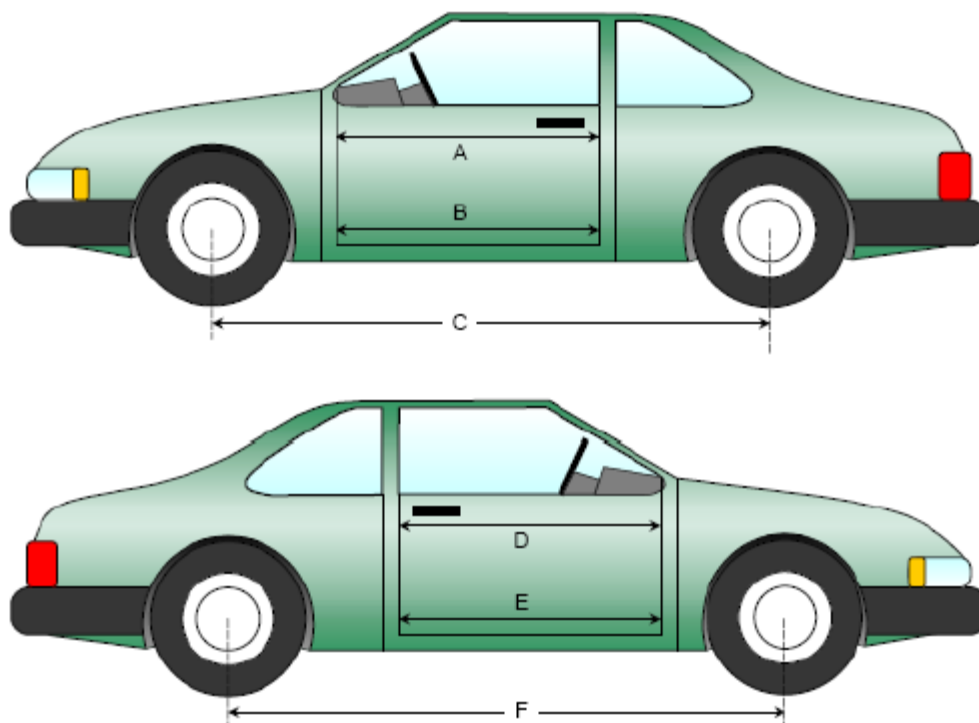
NHTSA No.: MD0117  
 Test Date: 1/31/2013

**DOOR OPENING WIDTH**

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	955	955	0
B	Left Side Lower	mm	929	929	0
D	Right Side Upper	mm	954	955	1
E	Right Side Lower	mm	907	906	-1

**WHEELBASE MEASUREMENTS**

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	3,024	2,902	-122
F	Right Side Wheelbase	mm	3,024	2,927	-97



**Left & Right Side Views**

# **DATA SHEET NO.14 ... (CONTINUED)** **VEHICLE INTRUSION MEASUREMENTS**

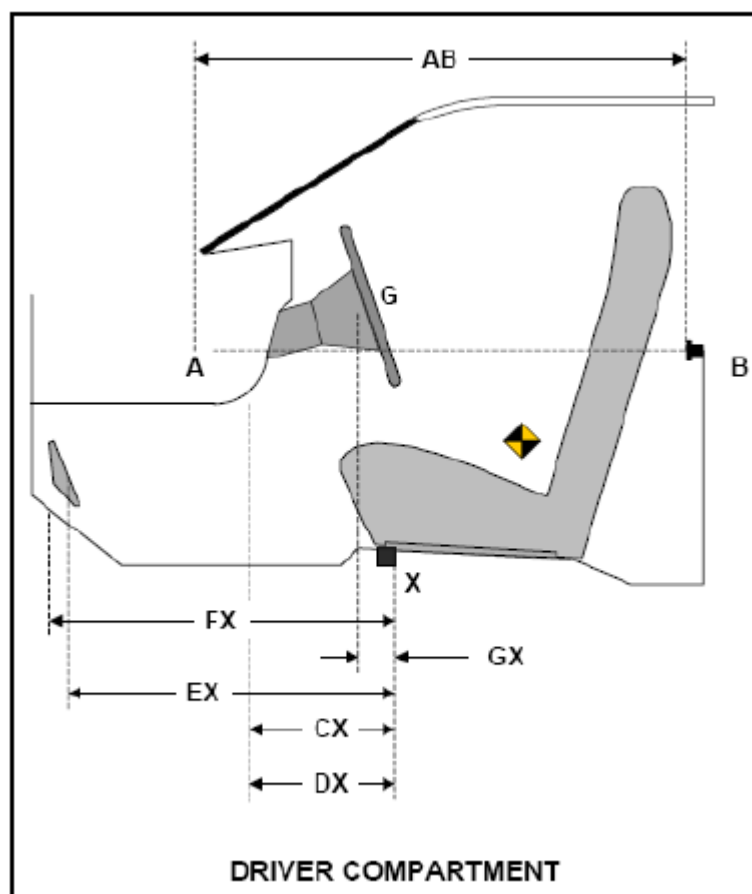
Test Vehicle: 2013 Chevrolet Traverse Four Door SUV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0117  
 Test Date: 1/31/2013

## **DRIVER COMPARTMENT INTRUSION**

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	785	785	0
CX	Left Knee Bolster to X	mm	390	389	-1
DX	Right Knee Bolster to X	mm	397	396	-1
EX	Brake Pedal to X	mm	628	612	-16
FX	Foot Rest to X	mm	641	634	-7
GX	Center of Steering Column Wheel Hub to X	mm	139	184	45

*X = Front of Seat Track (Stationary)*



**DATA SHEET NO. 15**  
**SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA**

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0117  
 Test Date: 1/31/2013

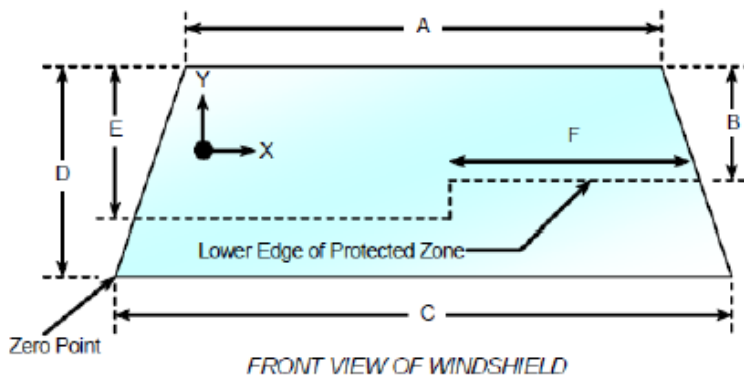
**Windshield Mounting Details:** A 0.8 mm trim surrounds the top and side of windshield while a plastic shroud is on the bottom.

*The standard requires that the post-test retention measurement be a minimum of 75% of the pre-test total periphery measurement for vehicles not equipped with occupant passive restraints and 50% for each side of the windshield for vehicles which are equipped with occupant passive restraints.*

**Temperature of windshield molding during test:** 20.7 °C

**WINDSHIELD PERIPHERY MEASUREMENTS**

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2,357	2,357	0
Right Side	2,357	2,357	0
Total	4,714	0	0



Item	Units	Value
A	mm	1,335
B	mm	552
C	mm	1,658
D	mm	860
E	mm	554
F	mm	356

**AREAS OF PROTECTED ZONE FAILURES**

- A. Provide coordinates of the area that the protected zone was penetrated more than .25 inches by a vehicle component other than one that is normally in contact with the windshield.
- No Penetration

X	Y

- B. Provide coordinates of the area beneath the protected zone that the inner surface of the windshield was penetrated by a vehicle component.
- No Penetration

X	Y

**DATA SHEET NO. 15 ... (CONTINUED)**  
**SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA**

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV  
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0117  
Test Date: 1/31/2013

**FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA**

Temperature at Time of Impact: -2 ° C

Test Time: 12:46 PM

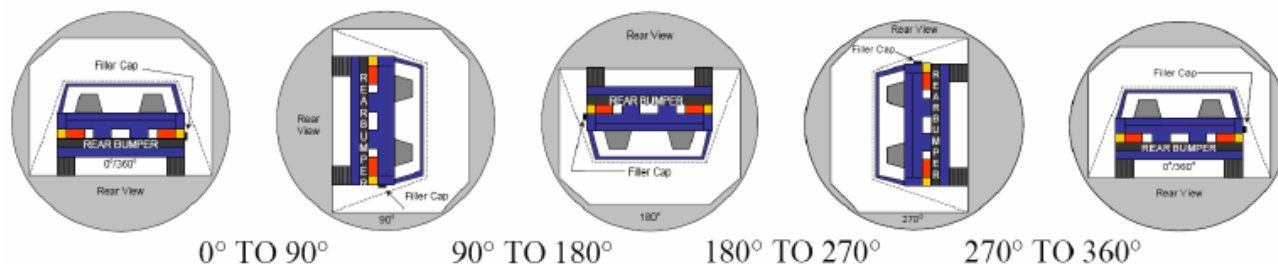
**STODDARD SOLVENT SPILLAGE MEASUREMENTS**

- A. From impact until vehicle motion ceases: 0 oz.  
(Maximum allowable is 1 oz.)
- B. For the 5-minute period after motion ceases: 0 oz.  
(Maximum allowable is 5 oz.)
- C. For the following 25 minutes: 0 oz.  
(Maximum allowable is 1 oz./minute)
- D. Spillage: No Spillage Occurred

**DATA SHEET NO. 16**  
**FMVSS 301 STATIC ROLLOVER RESULTS**

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0117  
 Test Date: 1/31/2013



1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. Details of Stoddard Solvent Spillage: Total Spillage was 0 oz. No Spillage Occurred

**SOLVENT COLLECTION TIME TABLE IN SECONDS**

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	72	300	372
90° to 180°	62	300	362
180° to 270°	63	300	363
270° to 360°	69	300	369

**FMVSS 301 SPILLAGE TABLE**

Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°	0	0	0	0
90° to 180°	0	0	0	0
180° to 270°	0	0	0	0
270° to 360°	0	0	0	0

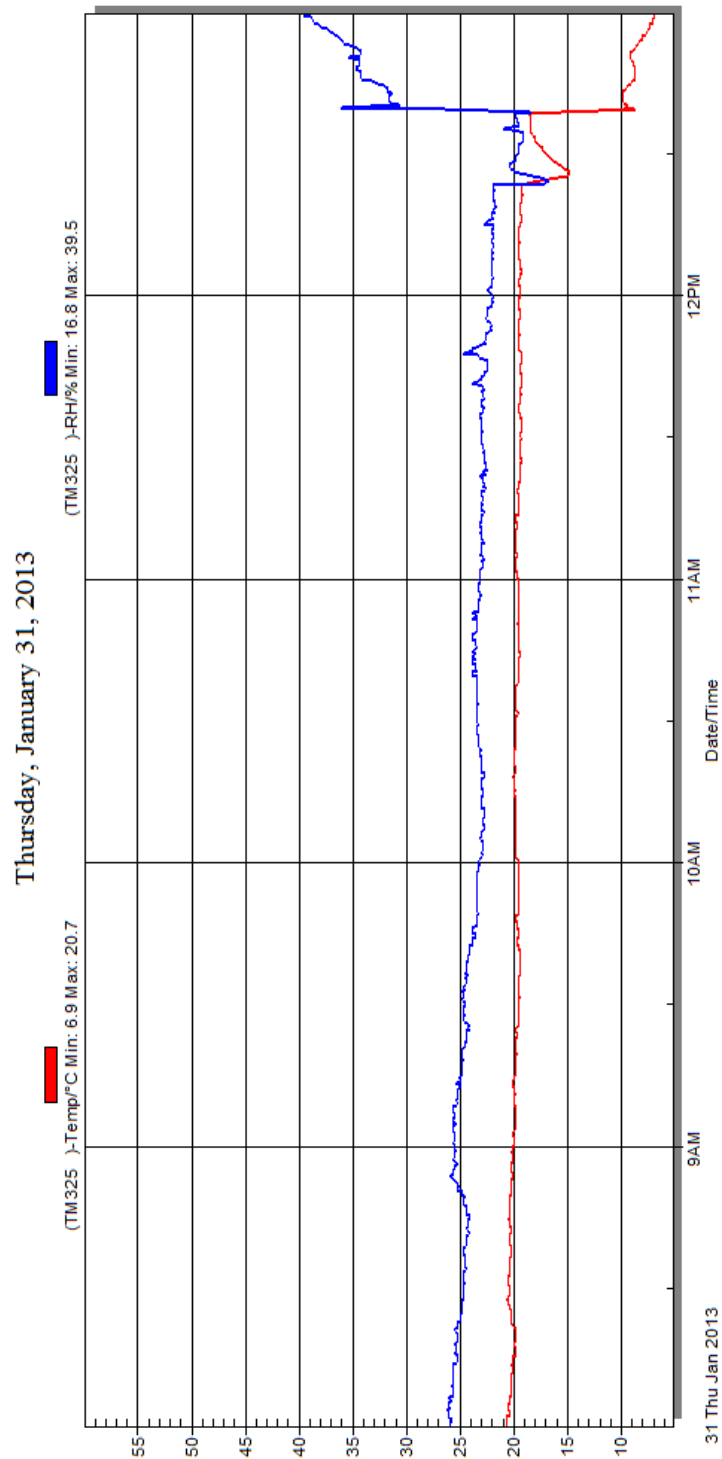
**SOLVENT SPILLAGE LOCATION TABLE**

Test Phase	Spillage Location
0° to 90°	N/A
90° to 180°	N/A
180° to 270°	N/A
270° to 360°	N/A

**DATA SHEET NO. 17**  
**DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART**

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV  
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0117  
Test Date: 1/31/2013



***Temperature and Humidity Stabilization Chart/Data for Dummies and Test Vehicle***

**APPENDIX A**  
**PHOTOGRAPHS**

## TABLE OF PHOTOGRAPHS

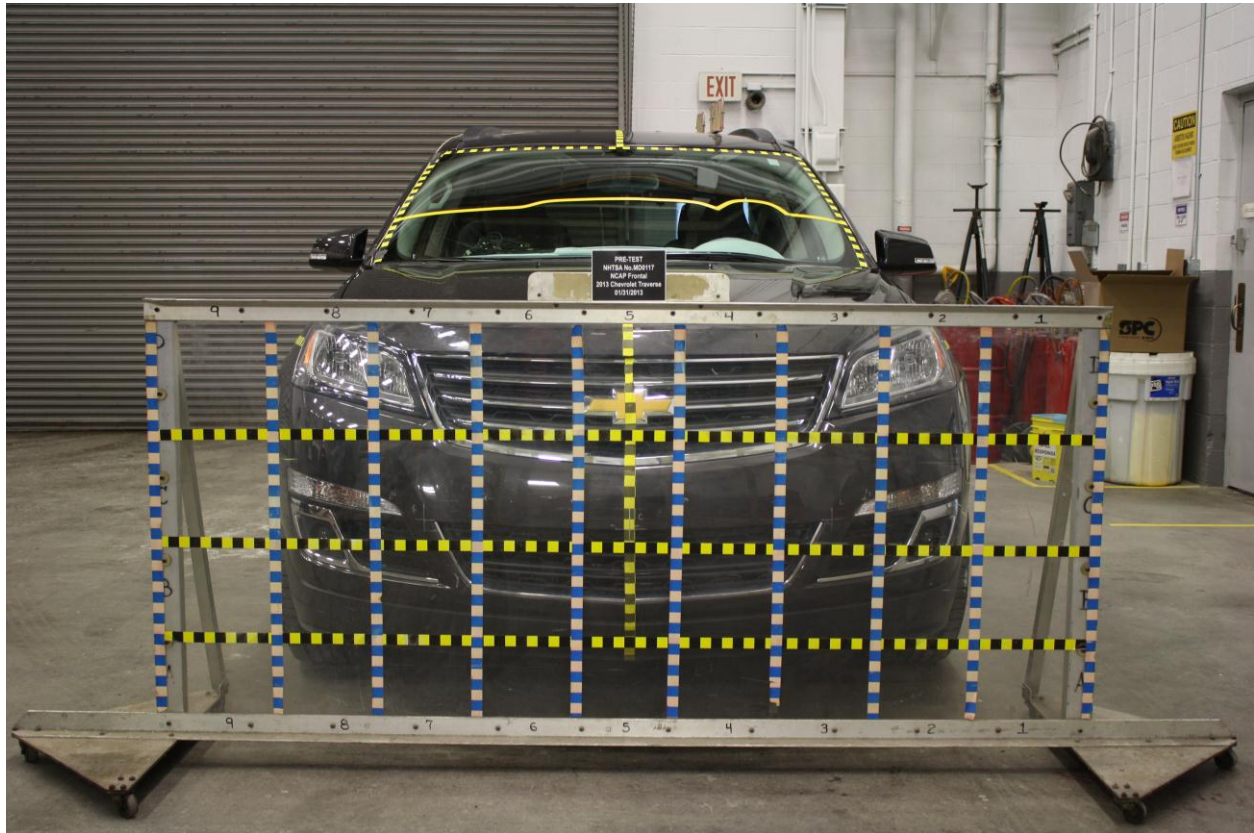
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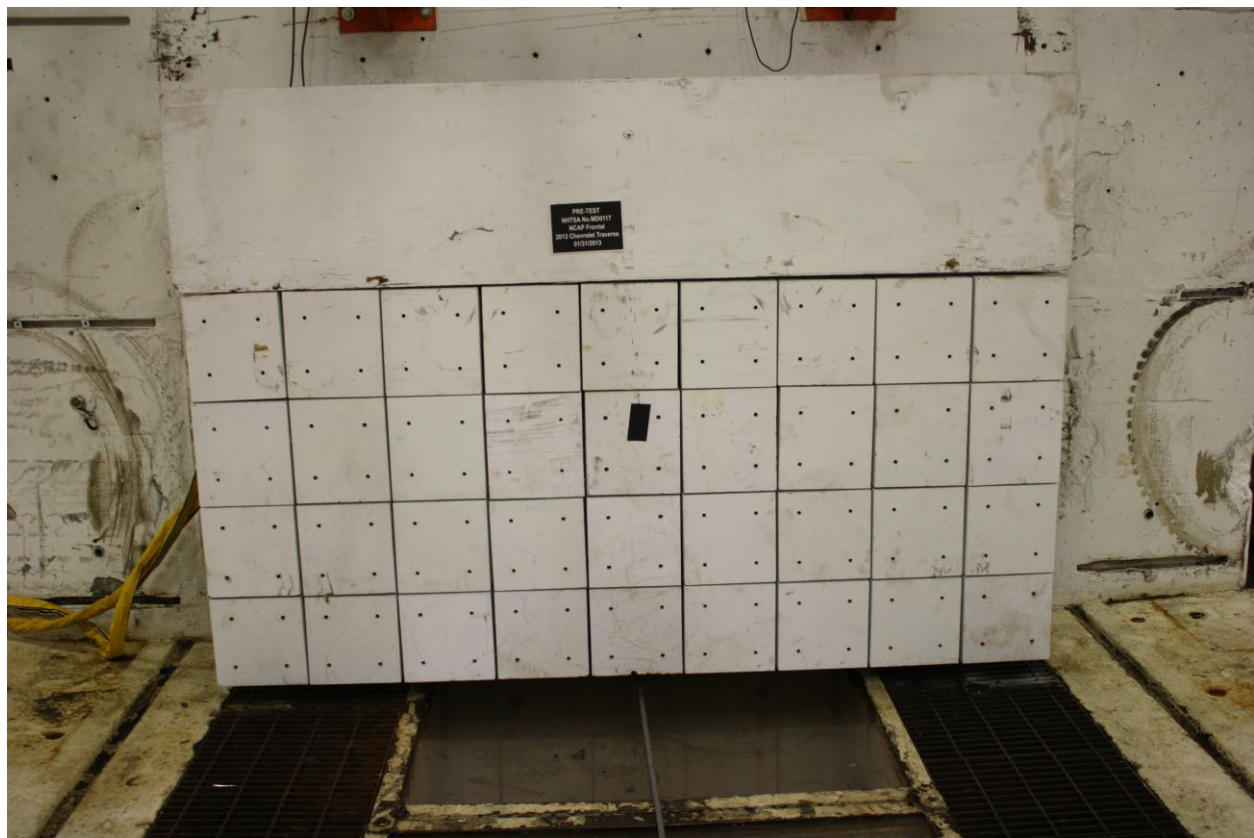
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<sup>1</sup>**NOTE:** *The underbody views should include the following vehicle components: fuel pump, fuel lines, sender unit, fuel tank filler pipe and any other visible system components.*



**Figure A-1: Load Cell Location**



**Figure A-2: Load Cell Wall**







**Figure A-5: 2013 Chevrolet Traverse Frontal As Delivered**

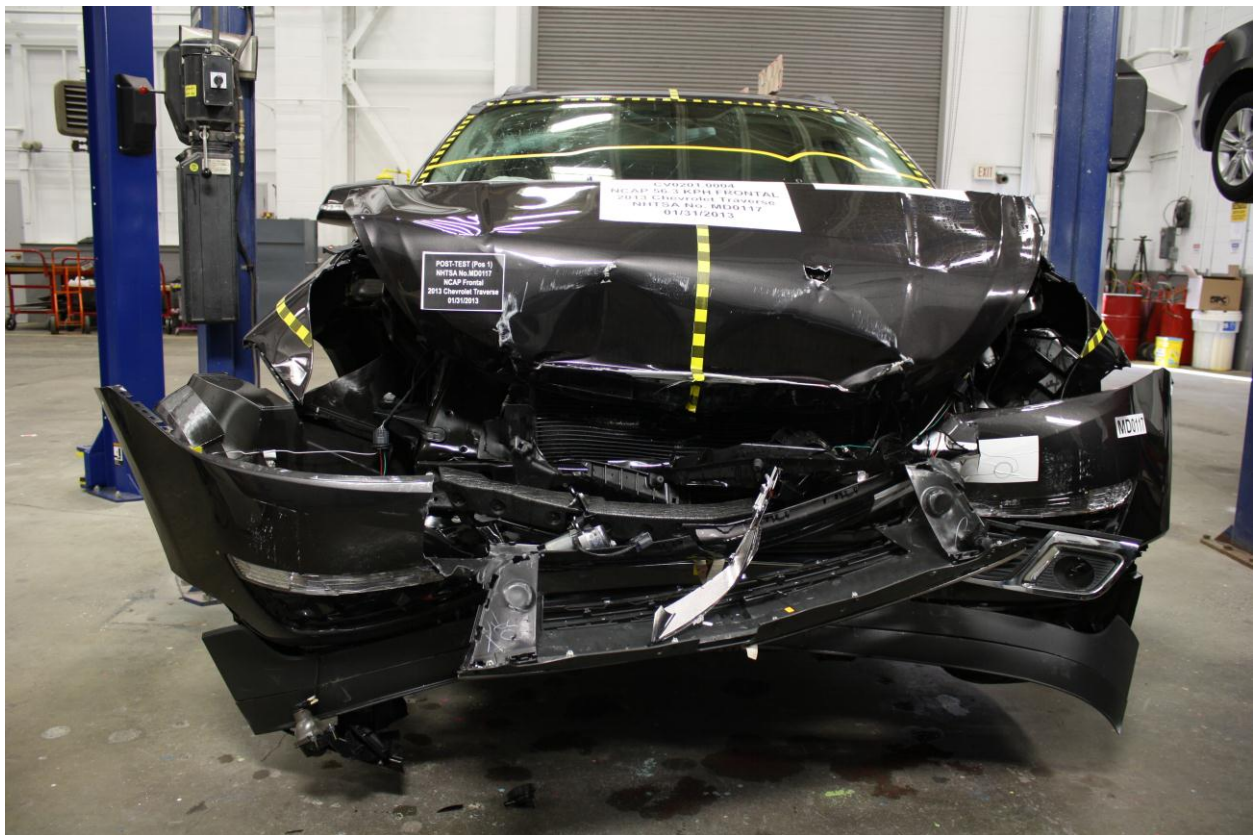


**Figure A-6: Left Rear 3-4 View, As Received**





**Figure A-7: Pre-Test Front View of Test Vehicle**



**Figure A-8: Post-Test Front View of Test Vehicle**





**Figure A-9: Pre-Test Left View of Test Vehicle**



**Figure A-10: Post-Test Left View of Test Vehicle**





**Figure A-11: Pre-Test Right View of Test Vehicle**



**Figure A-12: Post-Test Right View of Test Vehicle**









**Figure A-15: Pre-Test Left Rear 3-4 View**

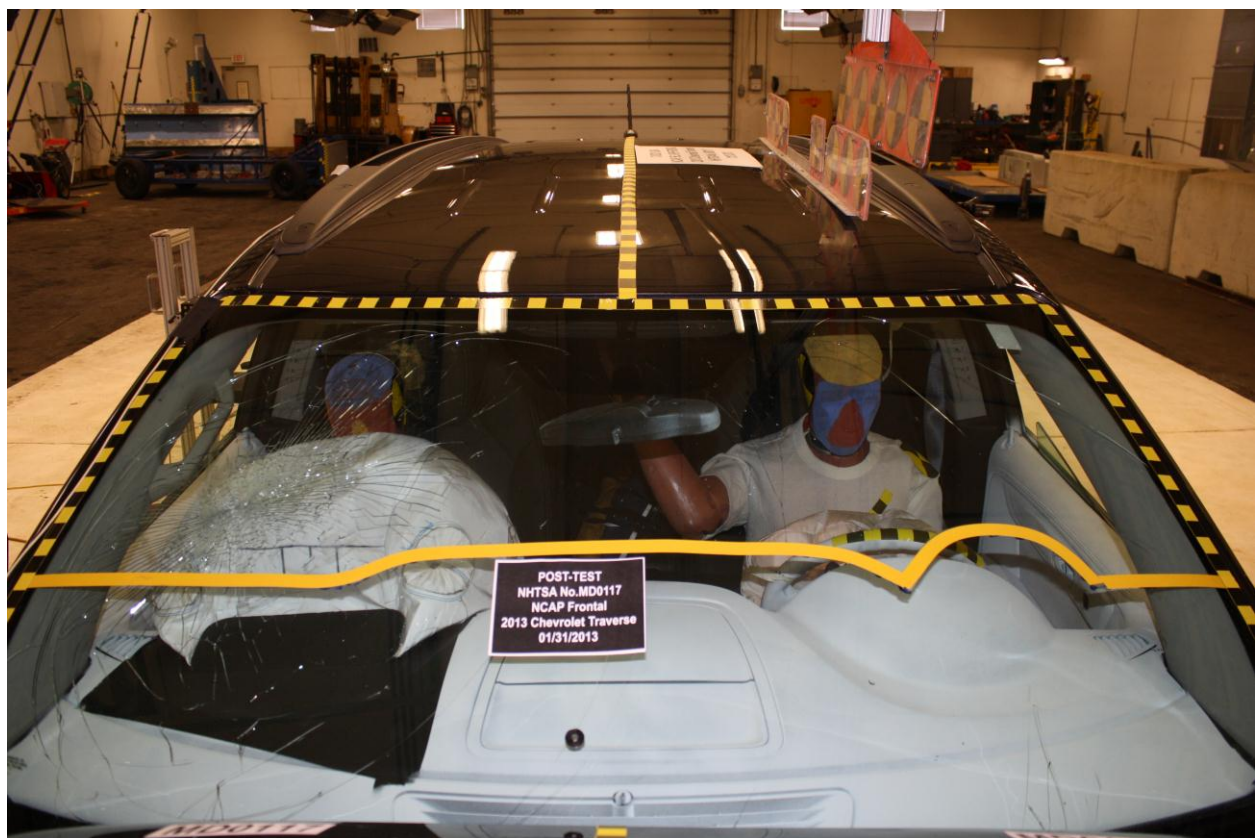


**Figure A-16: Post-Test Left Rear 3-4 View**





**Figure A-17: Pre-Test Windshield View**

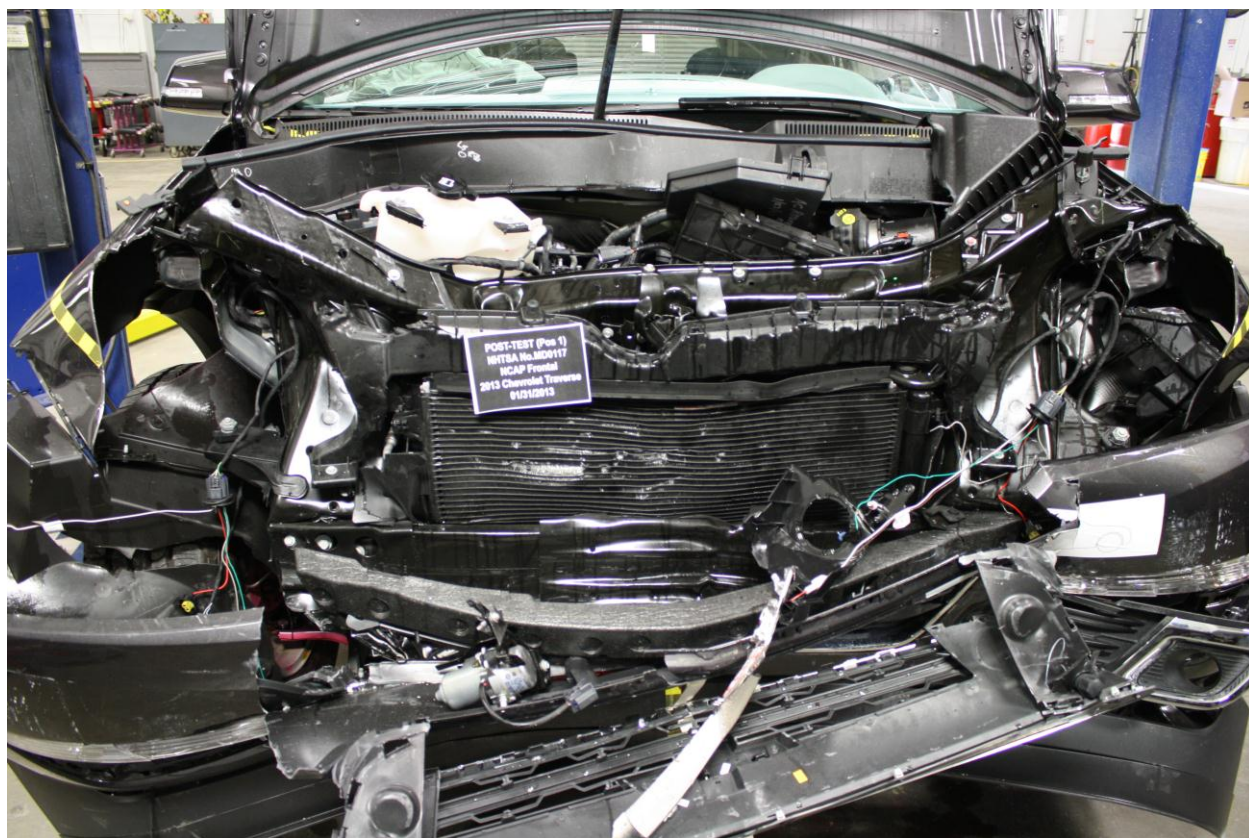


**Figure A-18: Post-Test Windshield View**





**Figure A-19: Pre-Test Engine Compartment View**



**Figure A-20: Post-Test Engine Compartment View**





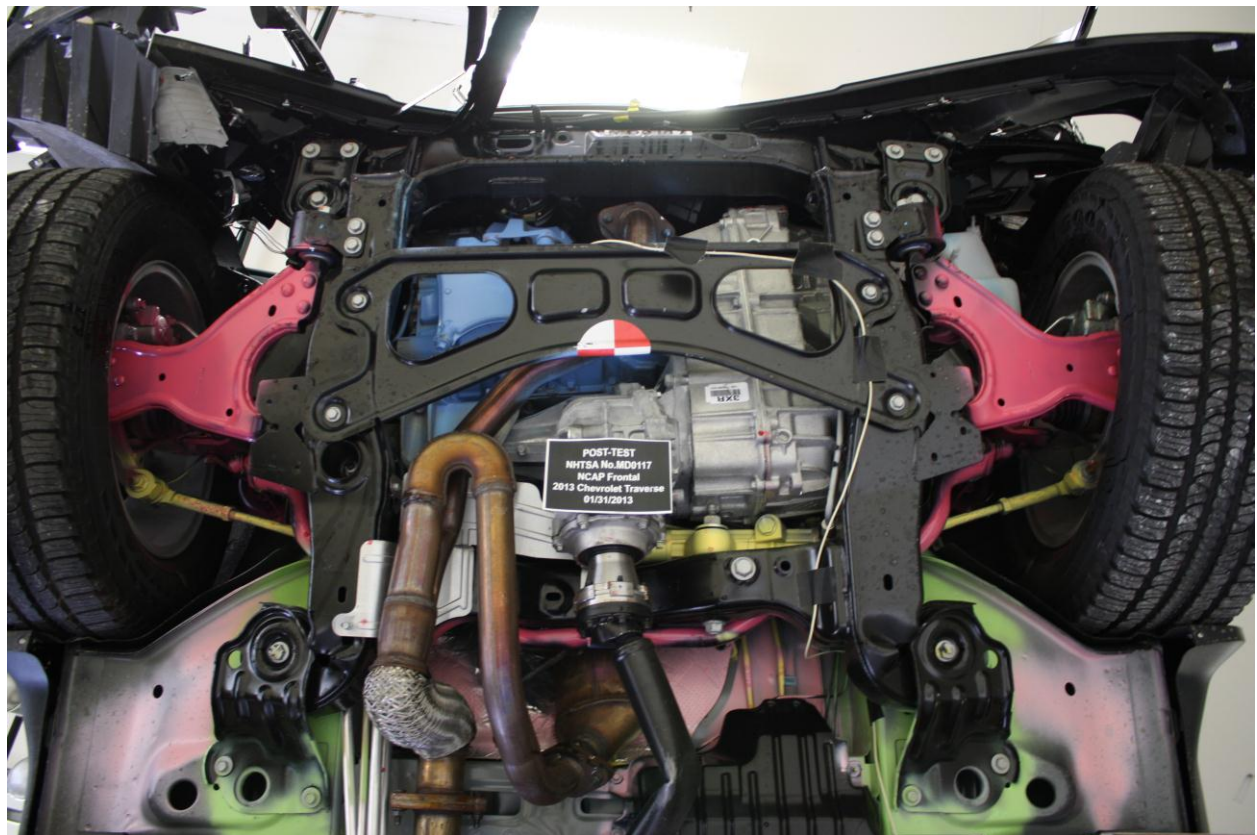
**Figure A-21: Pre-Test Fuel Filler Cap View**



**Figure A-22: Post-Test Fuel Filler Cap View**

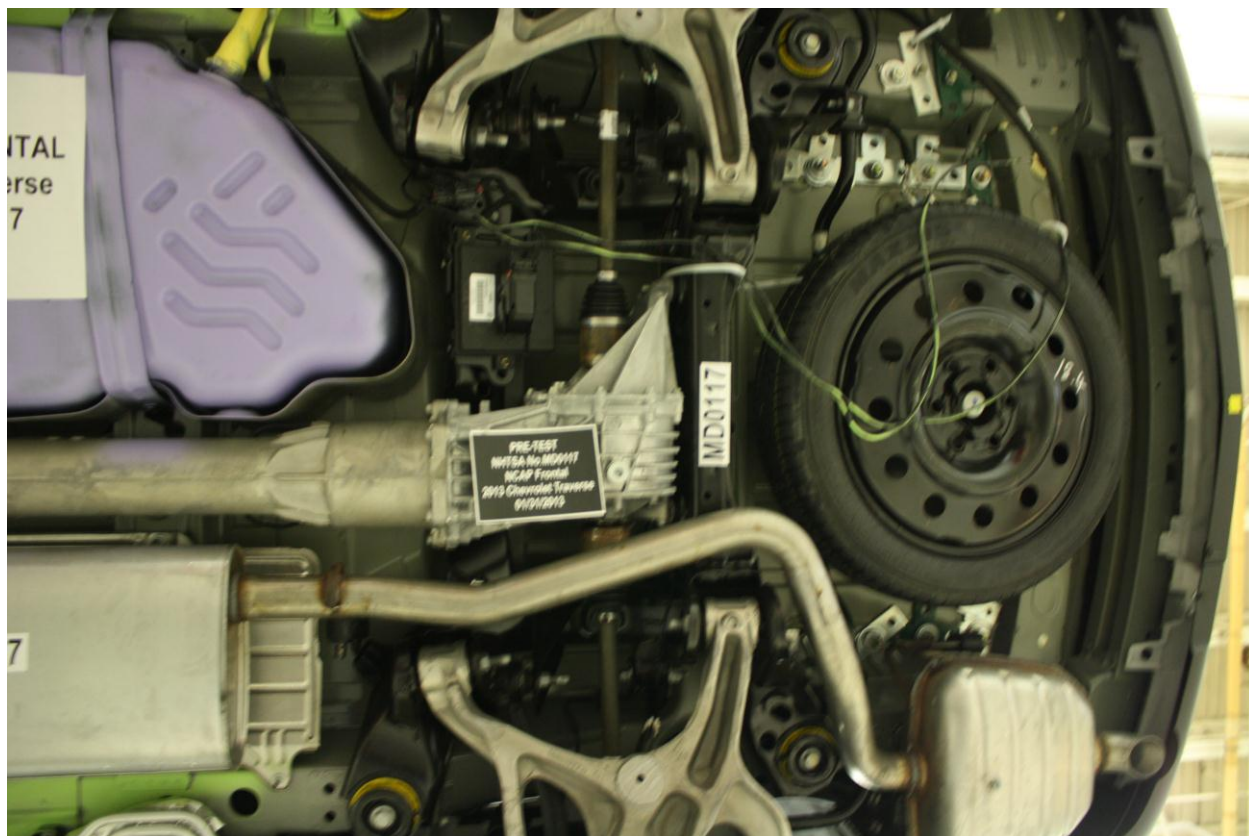


**Figure A-23: Pre-Test Front Underbody View**

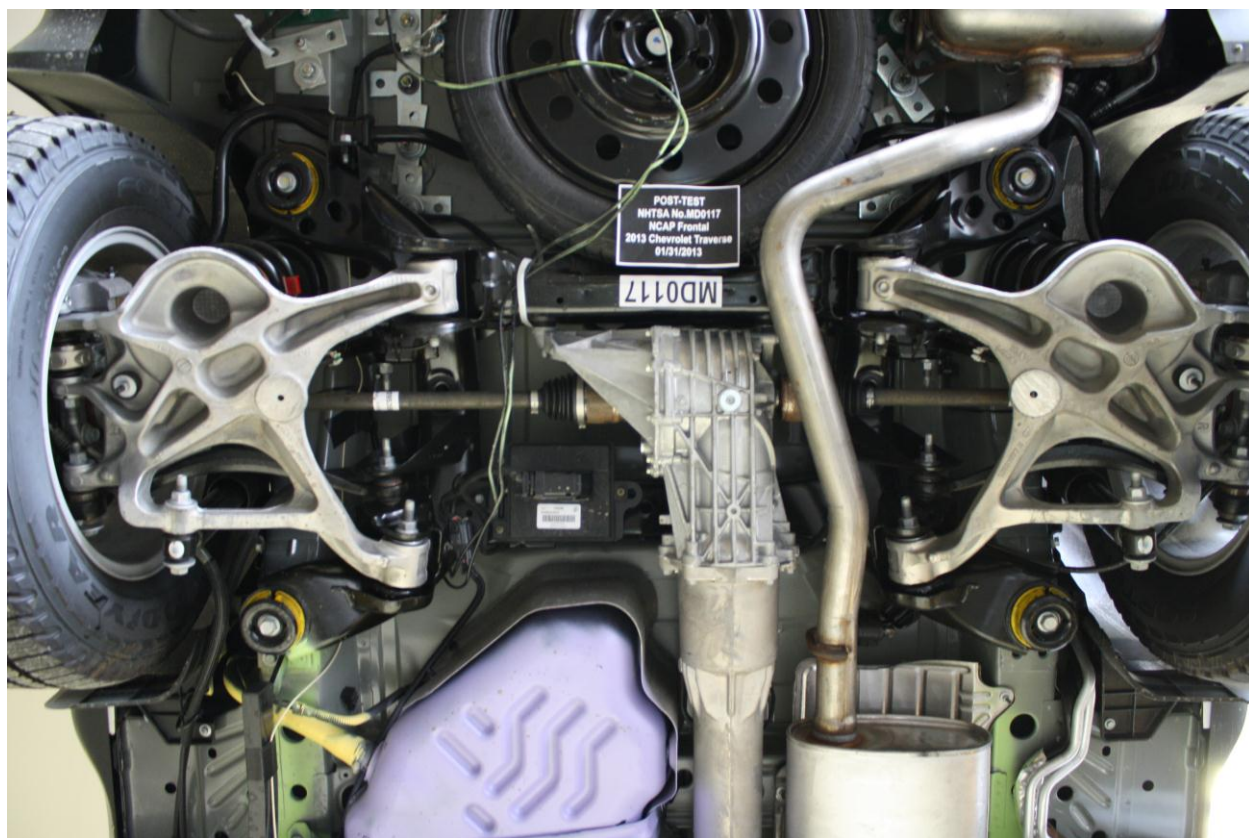


**Figure A-24: Post-Test Front Underbody View**



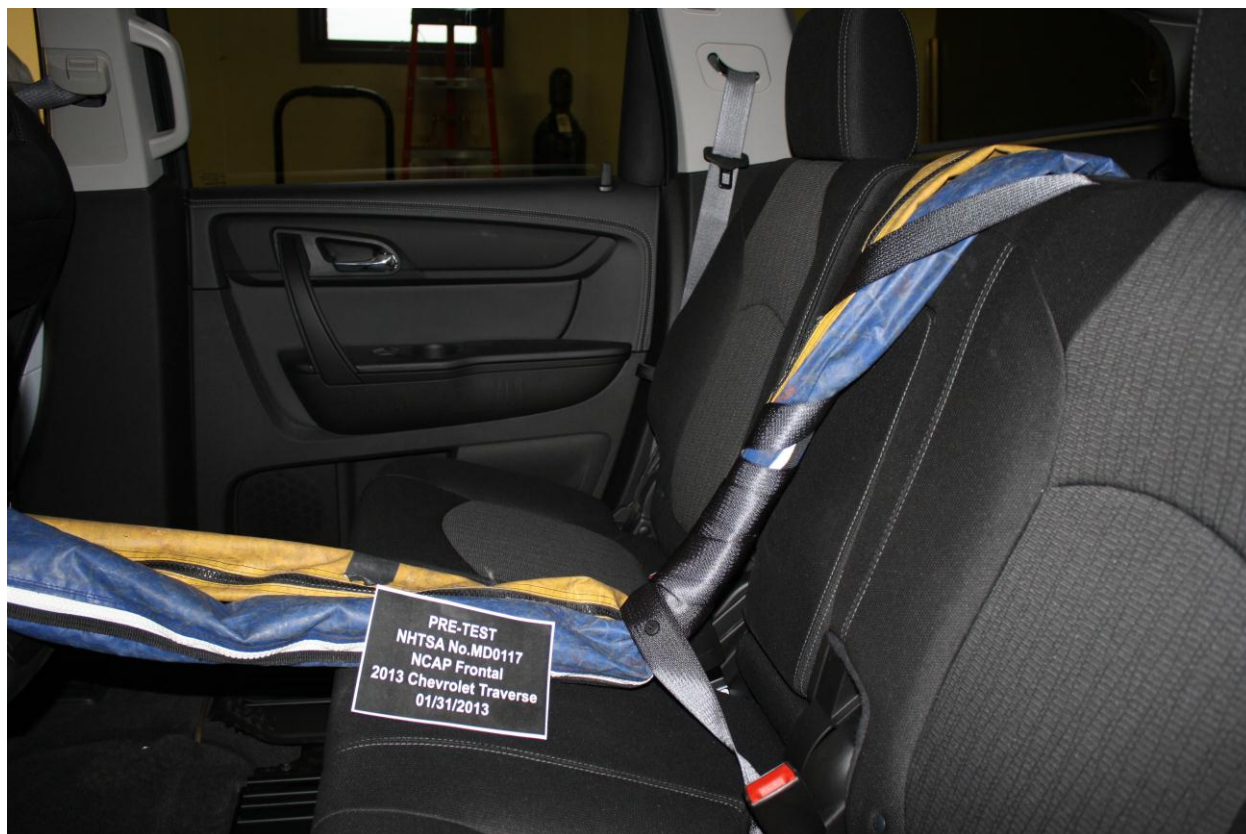


**Figure A-25: Pre-Test Rear Underbody View**

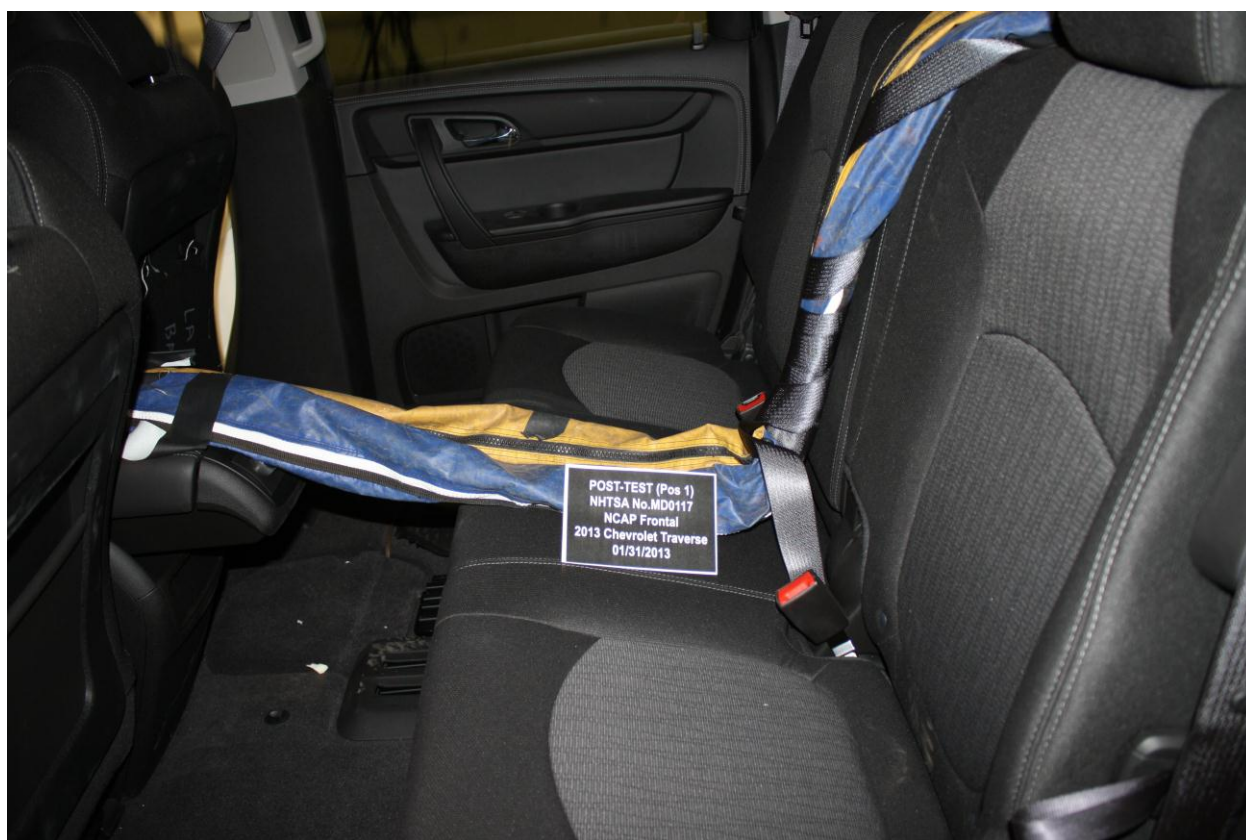


**Figure A-26: Post-Test Rear Underbody View**



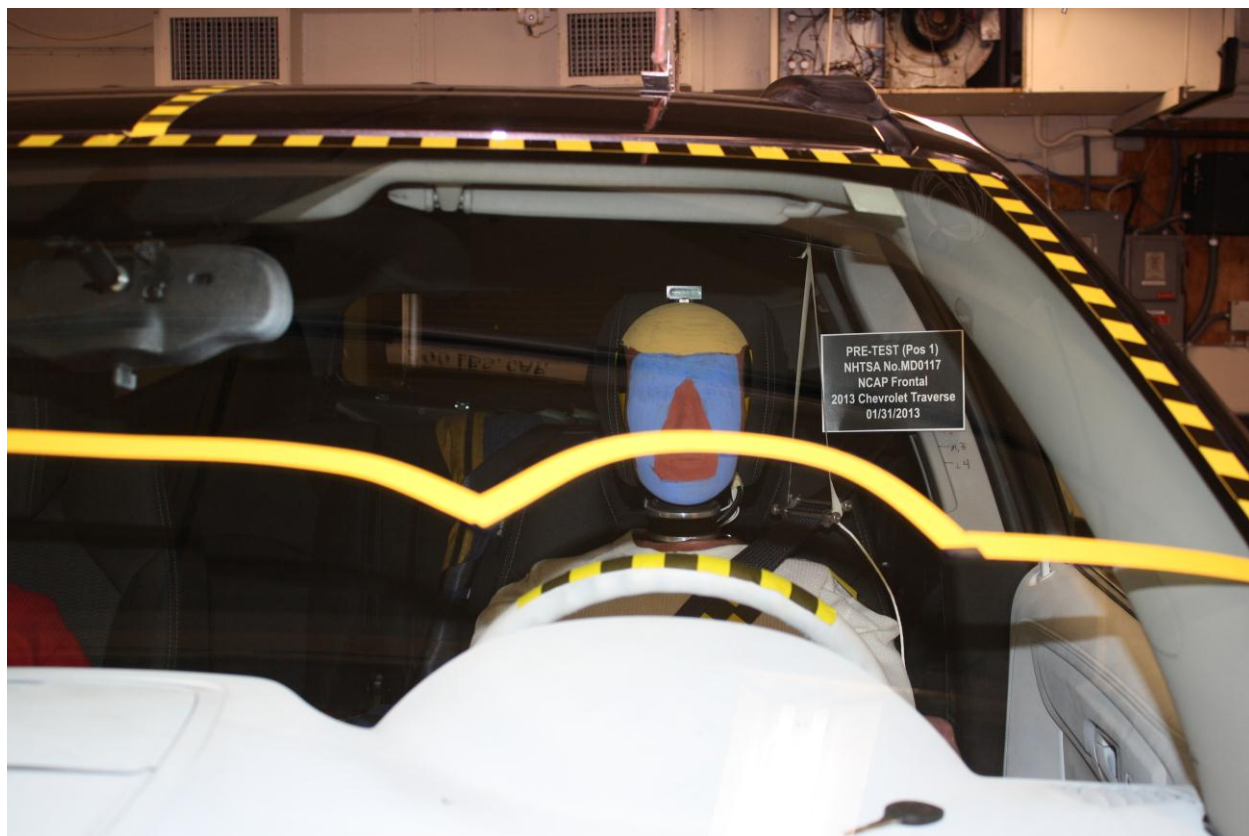


**Figure A-27: Pre-Test Dummy Cable Routing**



**Figure A-28: Post-Test Dummy Cable Routing**





**Figure A-29: Pre-Test Driver Dummy Front View**



**Figure A-30: Post-Test Driver Dummy Front View**



**Figure A-31: Pre-Test Driver Dummy Window View**



**Figure A-32: Post-Test Driver Dummy Window View**





**Figure A-33: Pre-Test Driver Dummy and Vehicle Interior View**



**Figure A-34: Post-Test Driver Dummy and Vehicle Interior View**





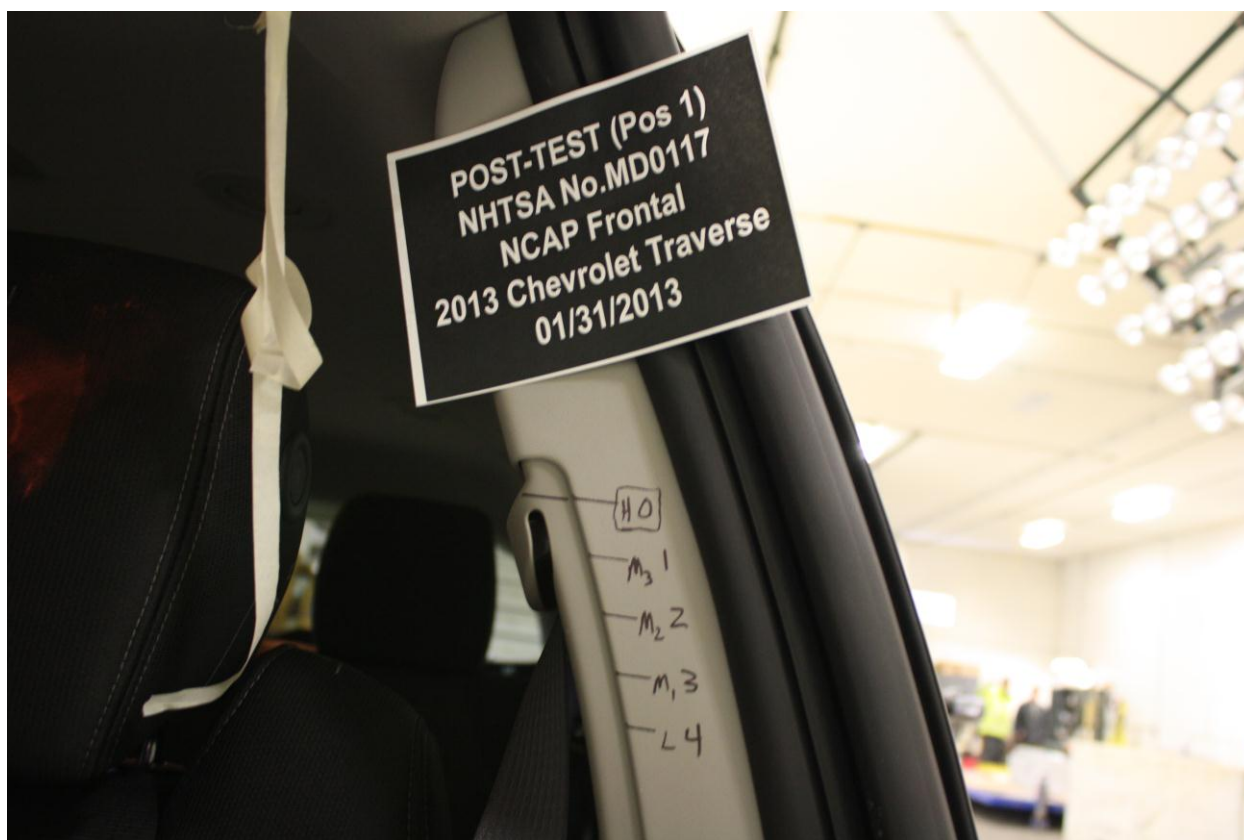
Figure A-35: Pre-Test Driver's Seat Fore-Aft Markings



Figure A-36: Post-Test Driver's Seat Fore-Aft Markings



**Figure A-37: Pre-Test View of Belt Anchorage for Driver Dummy**



**Figure A-38: Post-Test View of Belt Anchorage for Driver Dummy**





**Figure A-39: Pre-Test Driver Dummy Feet**



**Figure A-40: Post-Test Driver Dummy Feet**



**Figure A-41: Pre-Test Driver's Side Knee Bolster**



**Figure A-42: Post-Test Driver's Side Knee Bolster**





**Figure A-43: Pre-Test Driver's Side Floorpan**

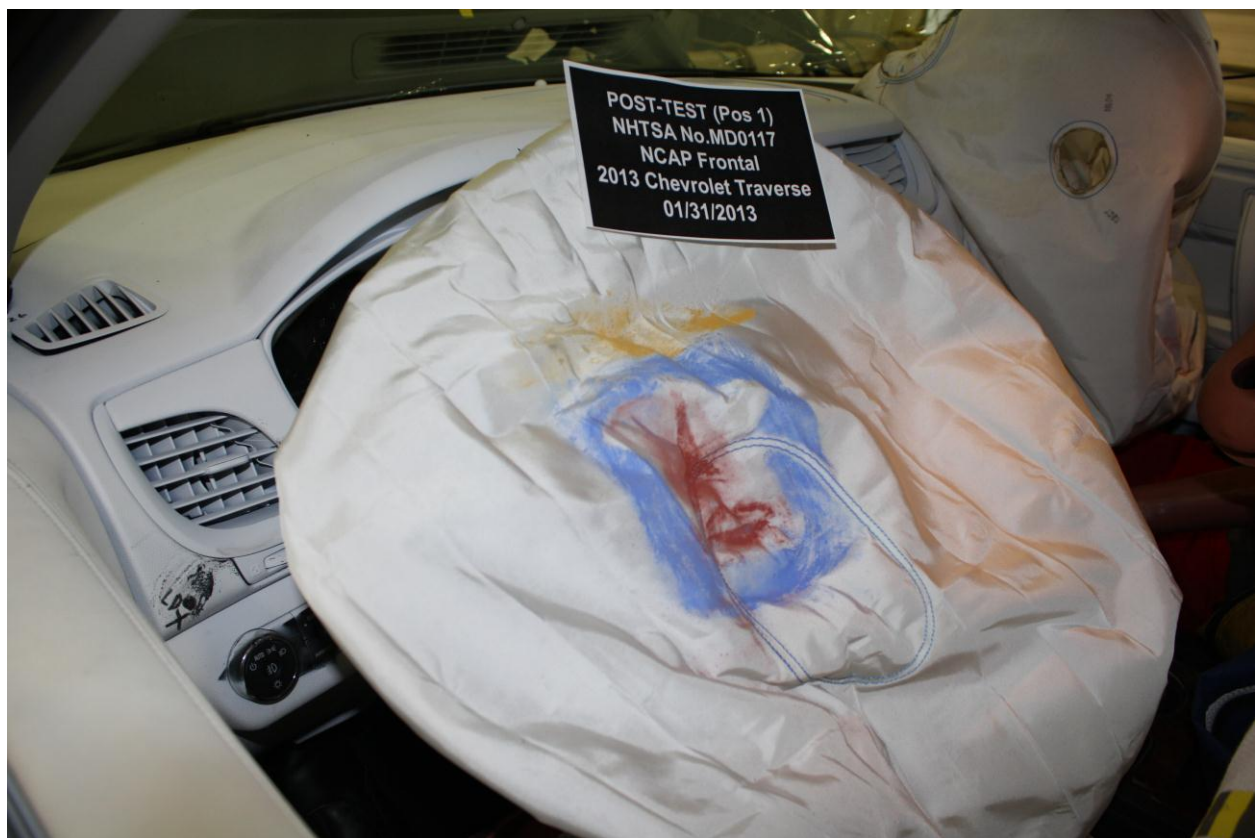


**Figure A-44: Post-Test Driver's Side Floorpan**

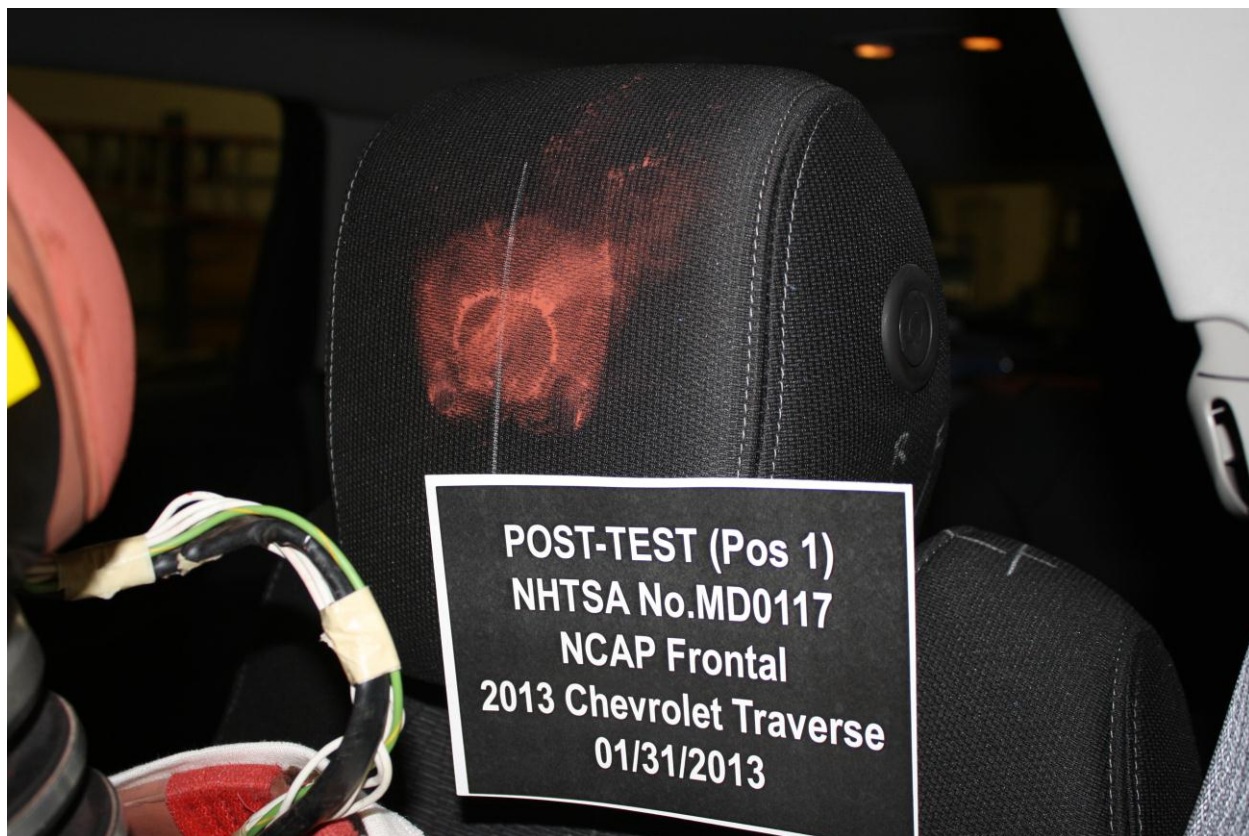




**Figure A-45: Post-Test Driver Dummy Face**



**Figure A-46: Post-Test Driver Dummy Contact With Airbag**

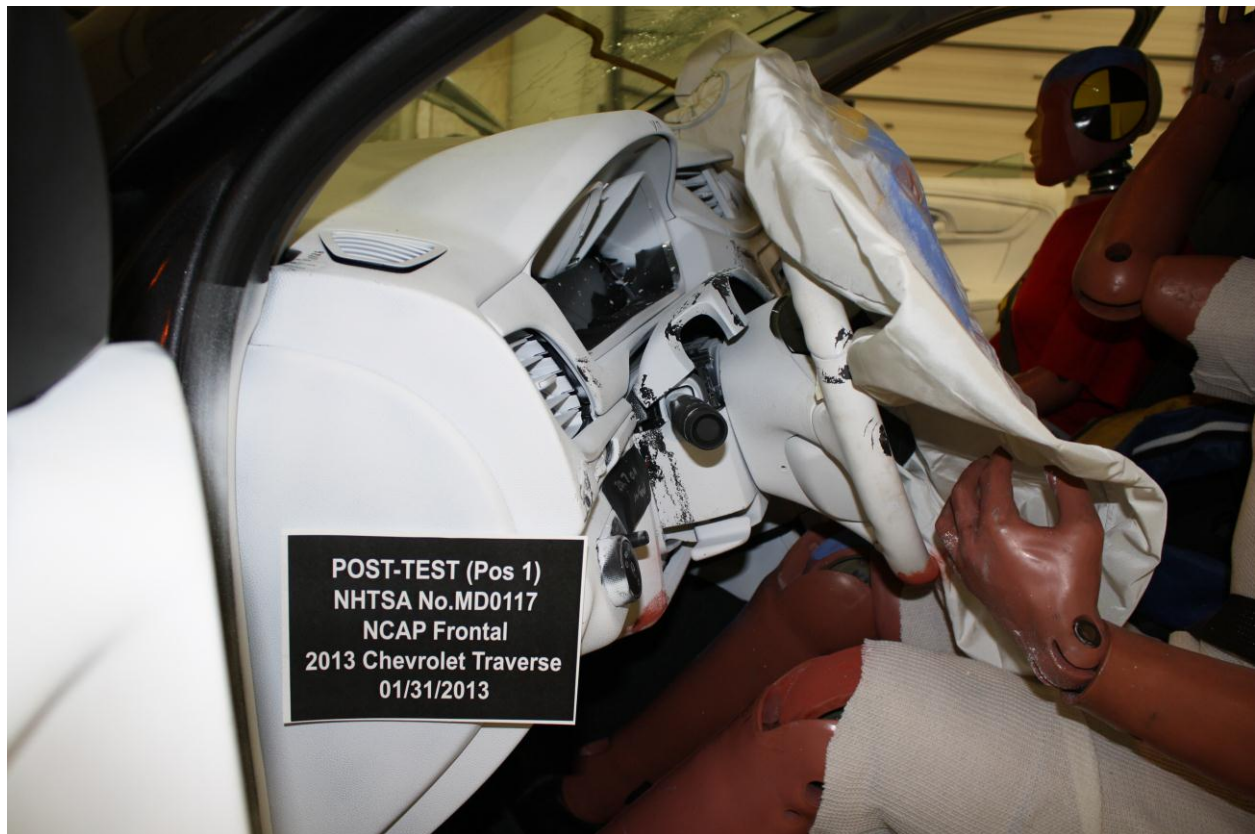


**Figure A-47: Post-Test Driver Dummy Contact With Headrest**



**Figure A-48: Pre-Test View of the Steering Wheel**





POST-TEST (Pos 1)  
NHTSA No.MD0117  
NCAP Frontal  
2013 Chevrolet Traverse  
01/31/2013

**Figure A-49: Post-Test View of the Steering Wheel**



PRE-TEST (Pos 2)  
NHTSA No.MD0117  
NCAP Frontal  
2013 Chevrolet Traverse  
01/31/2013

**Figure A-50: Pre-Test Passenger Dummy Front View**



**Figure A-51: Post-Test Passenger Dummy Front View**



**Figure A-52: Pre-Test Passenger Dummy Window View**





**Figure A-53: Post-Test Passenger Dummy Window View**



**Figure A-54: Pre-Test Passenger Dummy and Vehicle Interior View**

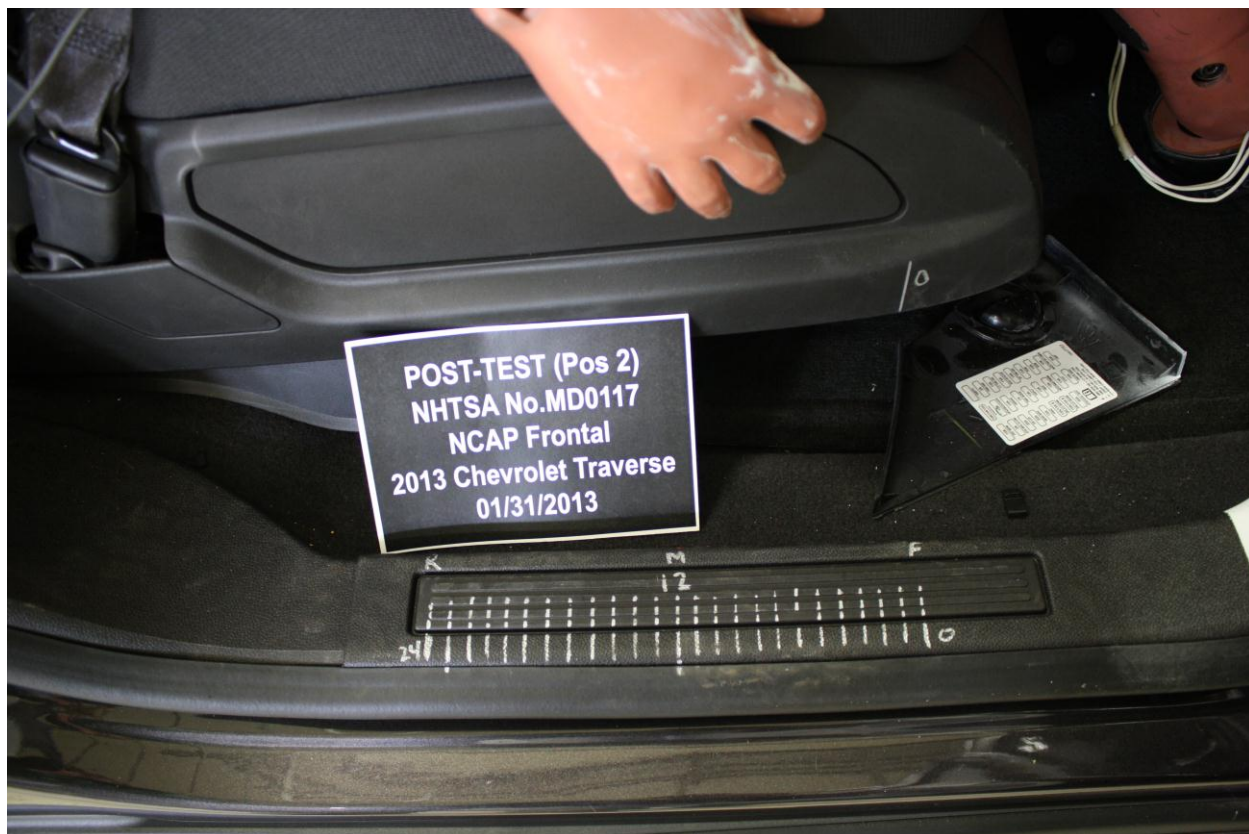


**Figure A-55: Post-Test Passenger Dummy and Vehicle Interior View**



**Figure A-56: Pre-Test Passenger's Seat Fore-Aft Markings**

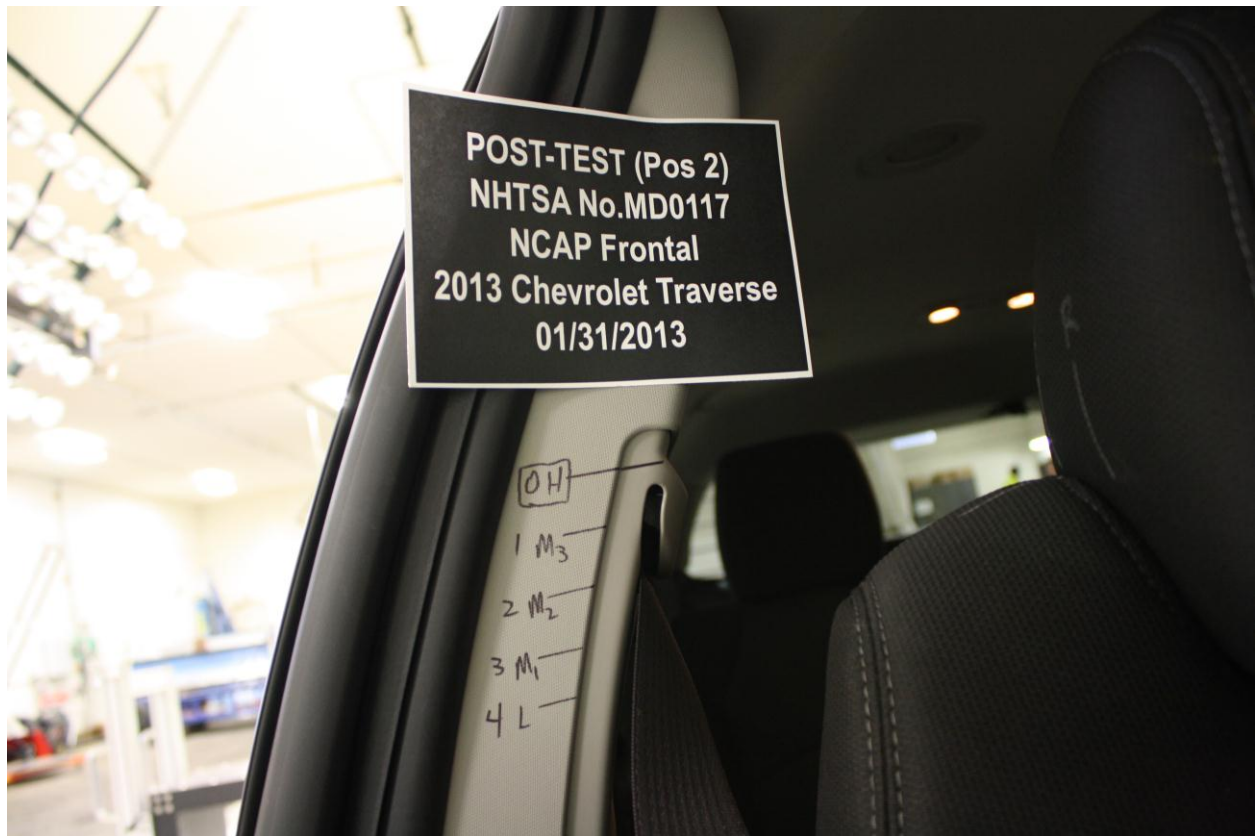




**Figure A-57: Post-Test Passenger's Seat Fore-Aft Markings**



**Figure A-58: Pre-Test View of Belt Anchorage for Passenger Dummy**



**Figure A-59: Post-Test View of Belt Anchorage for Passenger Dummy**



**Figure A-60: Pre-Test Passenger Dummy Feet**





**Figure A-61: Post-Test Passenger Dummy Feet**



**Figure A-62: Pre-Test Passenger's Side Knee Bolster**



**Figure A-63: Post-Test Passenger's Side Knee Bolster**



**Figure A-64: Pre-Test Passenger's Side Floorpan**





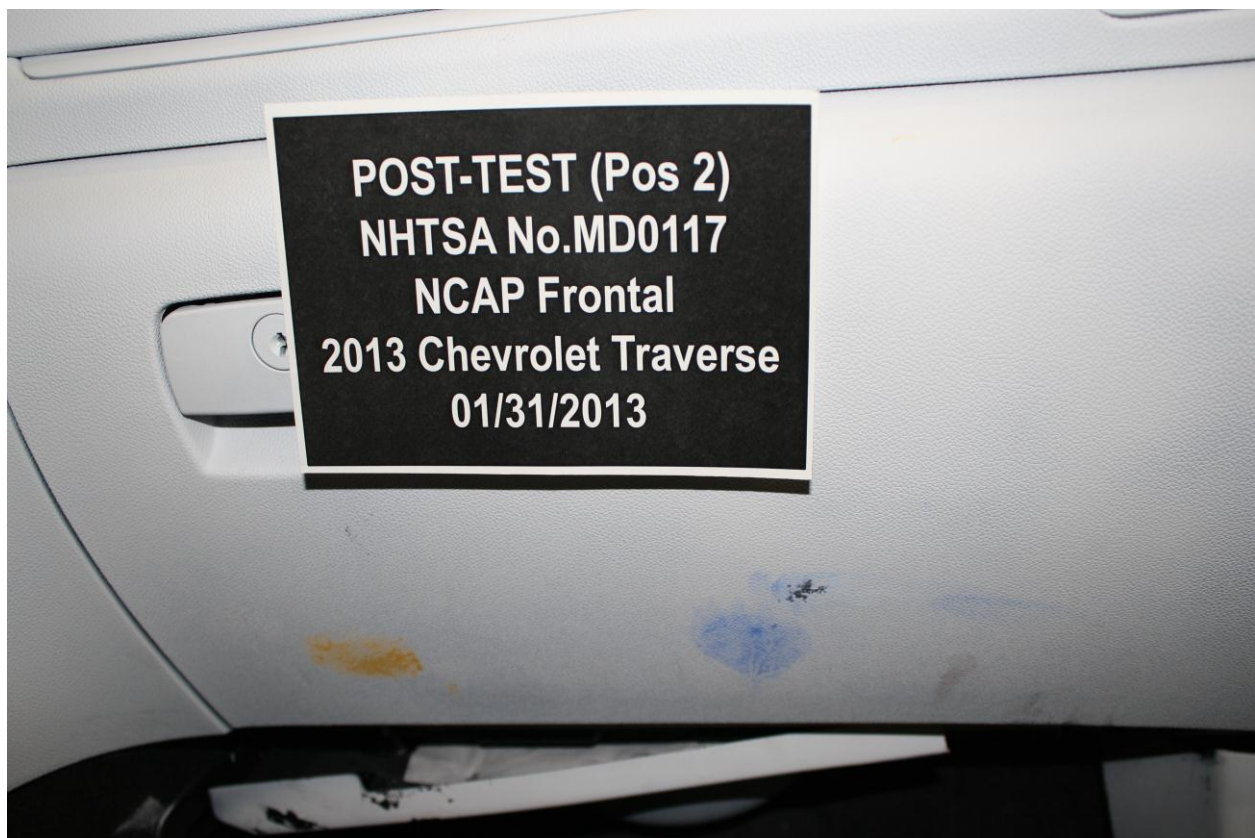
**Figure A-65: Post-Test Passenger's Side Floorpan**



**Figure A-66: Post-Test Passenger Dummy Contact With Airbag**



**Figure A-66a: Post-Test Passenger Dummy Contact With Headrest**



**Figure A-66b: Post-Test Passenger Dummy Contact With Glovebox**





**Figure A-67: Photograph of Ballast Installed in Vehicle**

# Photo Not Applicable

**Figure A-68: Post-Test Stoddard Solvent Spillage Location View, If Required**



**Figure A-69: Post-Test Speed Trap Read-Out**



**Figure A-70: Vehicle at 0° on Static Rollover Device**





**Figure A-71: Vehicle at 90° on Static Rollover Device**



**Figure A-72: Vehicle at 180° on Static Rollover Device**



**Figure A-73: Vehicle at 270° on Static Rollover Device**



**Figure A-74: Vehicle at 360° on Static Rollover Device**





Figure A-75: 2013 Chevrolet Traverse Frontal Impact Event

**2013 TRaverse AWD 1LT**  
 EXTERIOR: TUNGSTEN METALLIC  
 INTERIOR: EBONY

ENGINE 3.6L, SIDI V6  
 TRANSMISSION, 6-SPD AUTOMATIC

Visit us at [www.chevy.com](http://www.chevy.com)

<b>STANDARD EQUIPMENT</b> <small>ITEMS FEATURED BELOW ARE INCLUDED AT NO EXTRA CHARGE IN THE STANDARD VEHICLE PRICE SHOWN.</small> • 5 YEAR / 100,000 MILE POWERTRAIN LIMITED WARRANTY <small>SEE DEALER FOR DETAILS</small> <b>MECHANICAL</b> • ENGINE 3.6L, SIDI V6 • BRAKE ASSIST, HILL START <b>SAFETY &amp; SECURITY</b> • 6 MTHS ONSTAR DIRECTIONS AND CONNECTIONS WITH AUTOMATIC CRASH RESPONSE & TURN-BY-TURN NAVIGATION (ASK DEALER ABOUT GEOGRAPHIC COVERAGE) • REMOTE KEYLESS ENTRY, EXTENDED RANGE • AIR BAGS, FRONTAL AND SIDE-IMPACT FOR DRIVER AND FRONT PASSENGER, FRONT CENTER • SIDE-IMPACT, HEAD CURTAIN • SIDE-IMPACT IN OUTBOARD	<b>SEATING POSITIONS</b> • REAR CHILD SECURITY DOOR LOCK • ENGINE IMMOBILIZER • THEFT DETECTION SYSTEM • REAR VISION CAMERA SYSTEM • STABILITRAK - STABILITY CONTROL SYSTEM W/ TRACTION CONTROL • ANTI LOCK BRAKE SYSTEM • TIRE PRESSURE MONITOR SYSTEM (EXCL. SPARE TIRE) <b>INTERIOR</b> • 8 PASS SEATING W/ 2ND & 3RD ROW SPLIT BENCH SEAT • BLUE TOOTH FOR PHONE • PWR SEAT ADJUSTER, DRIVER • 8-WAY W/ POWER LUMBAR • AIR CONDITIONING-FRONT & REAR • STORAGE SYSTEM, REAR CARGO • CLOTH SEATS • CRUISE CONTROL • STEERING COLUMN, TILT	<b>AND TELESCOPIC</b> • LEATHER WRAP STEERING WHEEL • W/ AUDIO CONTROLS • 6.5" COLOR TOUCH RADIO, SIRIUSXM/HD, USB • XM RADIO + SERVICE SUBSCRIPTION SOLD SEPARATELY BY SIRIUSXM AFTER 3 MTHS <b>EXTERIOR</b> • BODYSIDE MOLDING, BODY COLOR • DUAL OUTSIDE POWER MIRRORS, MANUAL FOLD, TURN SIGNAL, HEATED • OUTSIDE MIRRORS • INTEGRAL SPOTTER • FOG LAMPS, FRONT • WHEELS, 18" ALUMINUM • REAR LIFTGATE, MANUAL • SPARE TIRE & WHEEL • REMOTE VEHICLE START • ULTRASONIC REAR PARK ASSIST
---	---	---

OPTIONS & PRICING	
<small>MANUFACTURER'S SUGGESTED RETAIL PRICE</small>	<b>STANDARD VEHICLE PRICE \$35,725.00</b>
<small>OPTIONS INSTALLED BY THE MANUFACTURER (MAY REPLACE STANDARD EQUIPMENT SHOWN)</small>	
DRIVER & FRONT PASSENGER HEATED SEATS	250.00
<b>TOTAL OPTIONS</b>	<b>\$250.00</b>
<b>TOTAL VEHICLE &amp; OPTIONS</b>	<b>\$35,975.00</b>
<b>DESTINATION CHARGE</b>	<b>\$25.00</b>
<b>TOTAL VEHICLE PRICE*</b>	<b>\$36,000.00</b>

**EPA DOT Fuel Economy and Environment**

**Fuel Economy**

**19** combined city/hwy  
**16** city  
**23** highway

**5.3** gallons per 100 miles

**Standard SUV's range from 12 to 28 MPG. The best vehicle rates 112 MPG.**

**You spend \$2,400 more in fuel costs over 5 years compared to the average new vehicle.**

**Annual fuel cost \$2,800**

**Fuel Economy & Greenhouse Gas Rating** (tailpipe only) **4**

**Smog Rating** (tailpipe only) **6**

This vehicle emits 476 grams CO<sub>2</sub> per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions, learn more at [fuelconomy.gov](http://fuelconomy.gov).

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 24 MPG and costs \$11,800 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$3.95 per gallon. MPG is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

[fuelconomy.gov](http://fuelconomy.gov)

Calculate personalized estimates and compare vehicles

**GOVERNMENT 5-STAR SAFETY RATINGS**

**Overall Vehicle Score To Be Rated**

Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.

Frontal Crash	Driver Passenger	To Be Rated
Side Crash	Front seat Rear seat	To Be Rated
Rollover		★★★★★

Star ratings range from 1 to 5 stars (★★★★★) with 5 being the highest. Source: National Highway Traffic Safety Administration (NHTSA) [www.safercar.gov](http://www.safercar.gov) or 1-888-327-4236

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This label has been applied pursuant to Federal law. You cannot remove this label prior to delivery to the ultimate purchaser. Includes Manufacturer's Recommended Pre-Delivery Service. Does not include dealer-installed options and accessories not listed above. Read Owner's Manual.

**FOR VEHICLES IN THIS COUNTRY: U.S./CANADIAN PARTS CONTENT: 77%**

NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.

**FOR THIS VEHICLE:**

**FINAL ASSEMBLY POINT:**  
 LANSING, MI U.S.A.  
**COUNTRY OF ORIGIN:**  
 ENGINE: UNITED STATES  
 TRANSMISSION: UNITED STATES

©2012 General Motors LLC  
 DETROIT, MI 48202-1000

ORDER NO. 0000000000 SALES CODE E  
 SALES MODEL CODE CY1428  
 DEALER NO. 000000  
 FINAL ASSEMBLY: LANSING, MI U.S.A.  
 VIN 1GNKVGKD0D105054  
 DEALER TO WHOM DELIVERED:  
 ELAM CHEVROLET COMPANY, INC.  
 301 E CHURCH ST  
 ELMIRA, NY 14901-2703

**DV**  
 1GA1225583

Figure A-76: Monroney Label Photograph



**APPENDIX B**

**DUMMY RESPONSE DATA TRACES**

## TABLE OF DATA PLOTS

### Driver & Passenger Dummy Instrumentation Plots

Fig.	Description	Page
1	Driver Head X Acceleration vs. Time Primary	B-5
2	Driver Head Y Acceleration vs. Time Primary	B-5
3	Driver Head Z Acceleration vs. Time Primary	B-6
4	Driver Head Resultant Acceleration vs. Time Primary	B-6
5	Driver Chest X Deflection vs. Time	B-7
6	Driver Chest X Acceleration vs. Time Primary	B-7
7	Driver Chest Y Acceleration vs. Time Primary	B-8
8	Driver Chest Z Acceleration vs. Time Primary	B-8
9	Driver Chest Resultant Acceleration vs. Time Primary	B-9
10	Driver Upper Neck Force X vs. Time Primary	B-9
11	Driver Upper Neck Force Z vs. Time Primary	B-10
12	Driver Upper Neck Moment Y vs. Time Primary	B-10
13	Driver Nij vs. Time Primary	B-11
14	Driver Left Femur Force vs. Time	B-11
15	Driver Right Femur Force vs. Time	B-12
16	Passenger Head X Acceleration vs. Time Primary	B-12
17	Passenger Head Y Acceleration vs. Time Primary	B-13
18	Passenger Head Z Acceleration vs. Time Primary	B-13
19	Passenger Head Resultant Acceleration vs. Time Primary	B-14
20	Passenger Chest X Deflection vs. Time	B-14
21	Passenger Chest X Acceleration vs. Time Primary	B-15
22	Passenger Chest Y Acceleration vs. Time Primary	B-15
23	Passenger Chest Z Acceleration vs. Time Primary	B-16
24	Passenger Chest Resultant Acceleration vs. Time Primary	B-16
25	Passenger Upper Neck Force X vs. Time Primary	B-17
26	Passenger Upper Neck Force Z vs. Time Primary	B-17
27	Passenger Upper Neck Moment Y vs. Time Primary	B-18
28	Passenger Nij vs. Time Primary	B-18
29	Passenger Left Femur Force vs. Time	B-19
30	Passenger Right Femur Force vs. Time	B-19

The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at [www.nhtsa.dot.gov](http://www.nhtsa.dot.gov)

#### **Additional Driver Dummy Instrumentation Data**

Driver Head X Acceleration Redundant  
Driver Head Y Acceleration Redundant  
Driver Head Z Acceleration Redundant  
Driver Upper Neck Force Y  
Driver Upper Neck Moment X  
Driver Upper Neck Moment Z  
Driver Chest X Acceleration Redundant  
Driver Chest Y Acceleration Redundant  
Driver Chest Z Acceleration Redundant  
Driver Pelvis X  
Driver Pelvis Y  
Driver Pelvis Z  
Driver Left Femur Redundant  
Driver Right Femur Redundant  
Driver Left Upper Tibia Moment X  
Driver Left Upper Tibia Moment Y  
Driver Left Upper Tibia Force Z  
Driver Left Lower Tibia Moment X  
Driver Left Lower Tibia Moment Y  
Driver Left Lower Tibia Force Z  
Driver Right Upper Tibia Moment X  
Driver Right Upper Tibia Moment Y  
Driver Right Upper Tibia Force Z  
Driver Right Lower Tibia Moment X  
Driver Right Lower Tibia Moment Y  
Driver Right Lower Tibia Force Z  
Driver Left Foot Fore Z  
Driver Left Foot Aft X  
Driver Left Foot Aft Z  
Driver Right Foot Fore Z  
Driver Right Foot Aft X  
Driver Right Foot Aft Z  
Driver Shoulder Belt Force  
Driver Lap Belt Force

#### **Additional Passenger Dummy Instrumentation Data**

Passenger Head X Acceleration Redundant  
Passenger Head Y Acceleration Redundant  
Passenger Head Z Acceleration Redundant  
Passenger Upper Neck Force X  
Passenger Upper Neck Force Z  
Passenger Upper Neck Moment Y  
Passenger Chest X Acceleration Redundant  
Passenger Chest Y Acceleration Redundant  
Passenger Chest Z Acceleration Redundant  
Passenger Pelvis X



## **Additional Passenger Dummy Instrumentation Data ... (continued)**

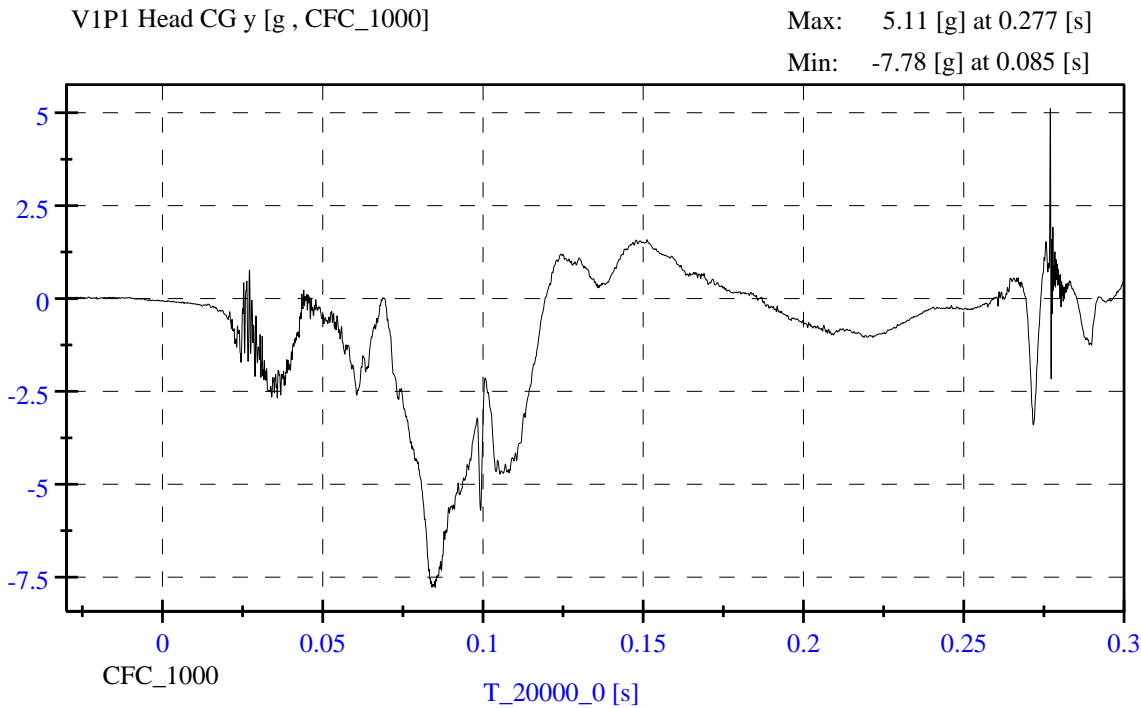
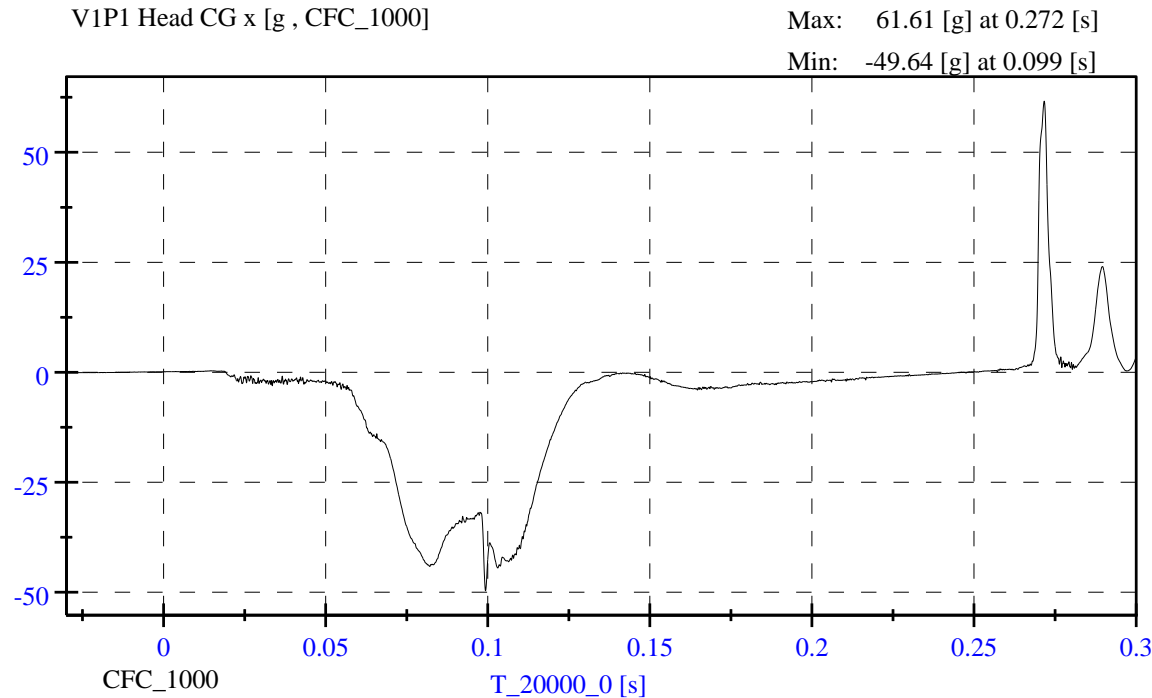
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Passenger Left Femur Redundant  
Passenger Right Femur Redundant  
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Passenger Left Upper Tibia Moment Y  
Passenger Left Upper Tibia Force Z  
Passenger Left Lower Tibia Moment X  
Passenger Left Lower Tibia Moment Y  
Passenger Left Lower Tibia Force Z  
Passenger Right Upper Tibia Moment X  
Passenger Right Upper Tibia Moment Y  
Passenger Right Upper Tibia Force Z  
Passenger Right Lower Tibia Moment X  
Passenger Right Lower Tibia Moment Y  
Passenger Right Lower Tibia Force Z  
Passenger Left Foot Fore Z  
Passenger Left Foot Aft X  
Passenger Left Foot Aft Z  
Passenger Right Foot Fore Z  
Passenger Right Foot Aft X  
Passenger Right Foot Aft Z  
Passenger Shoulder Belt Force  
Passenger Lap Belt Force

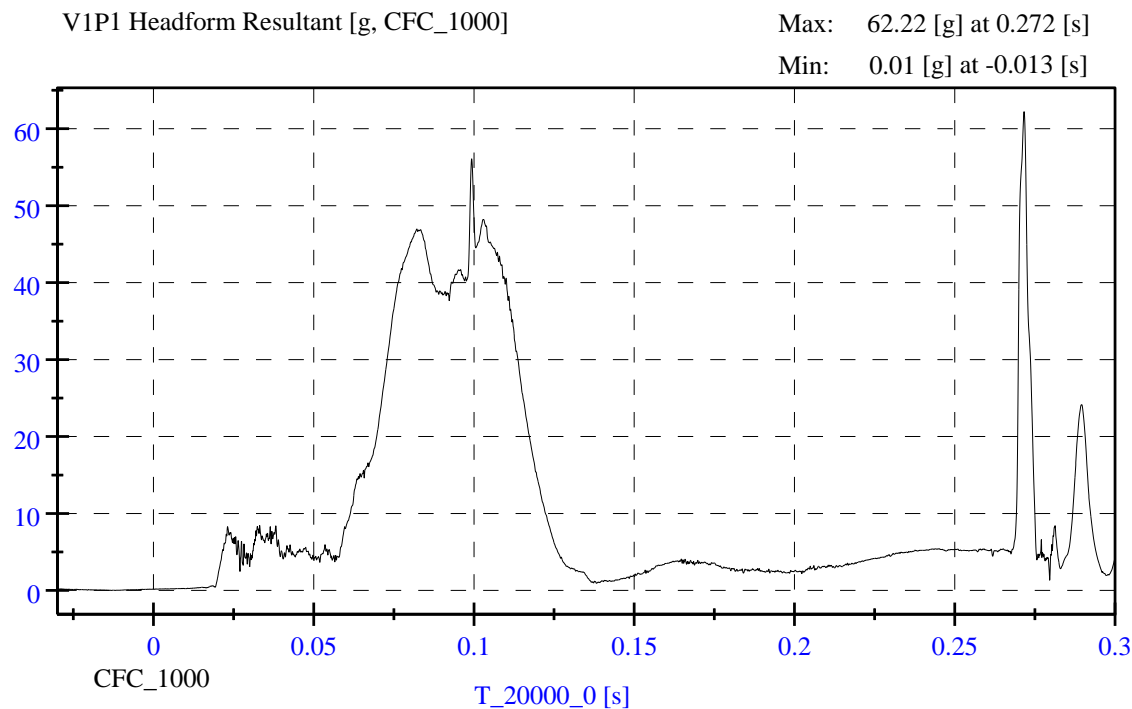
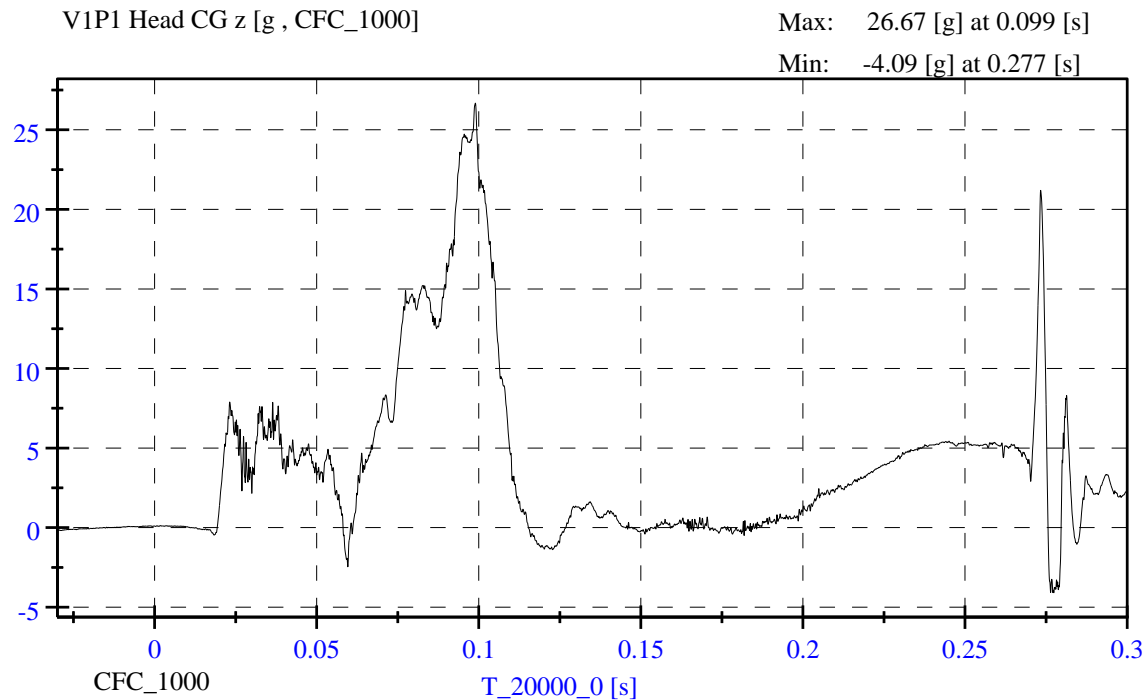
### **Vehicle Instrumentation Data**

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Left Rear Seat Crossmember Z  
Right Rear Seat Crossmember X  
Right Rear Seat Crossmember Z  
Left Rear Seat Crossmember X Redundant  
Right Rear Seat Crossmember X Redundant  
Vehicle Engine Top X  
Vehicle Engine Bottom X

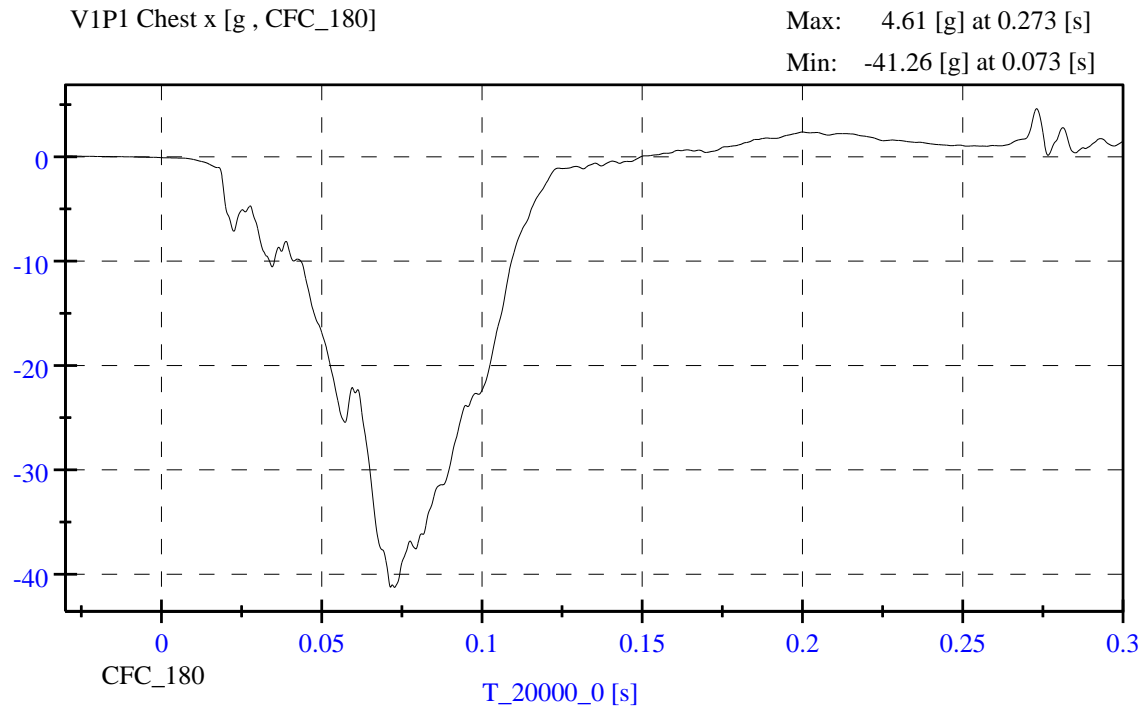
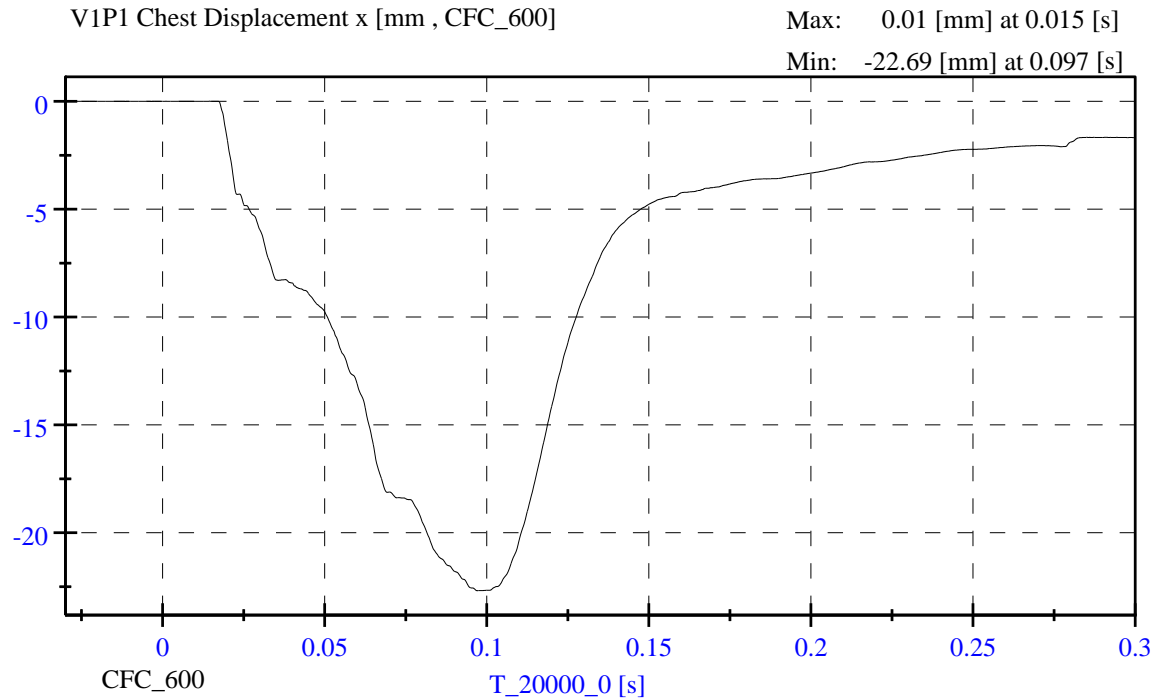
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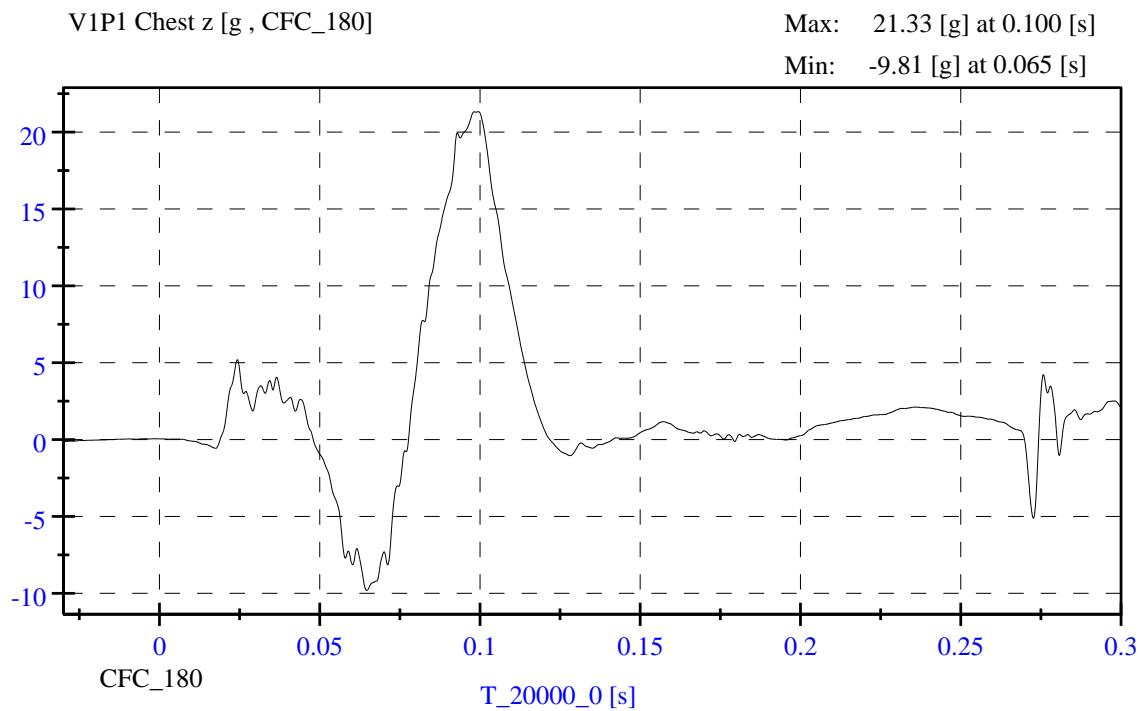
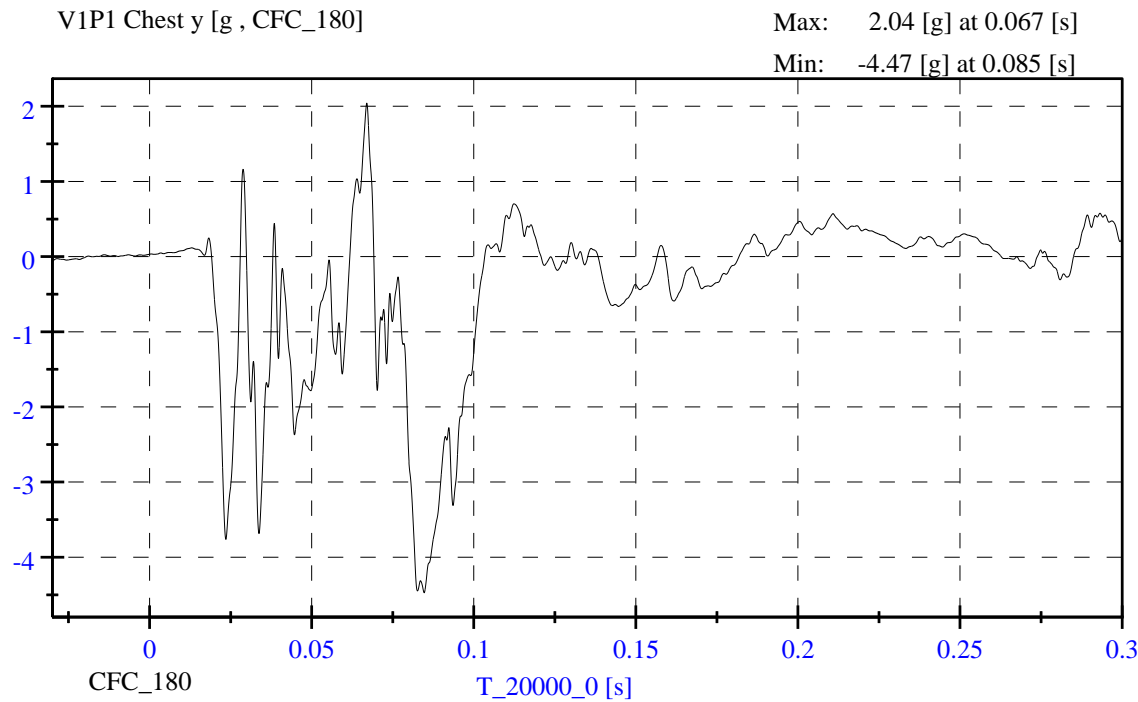
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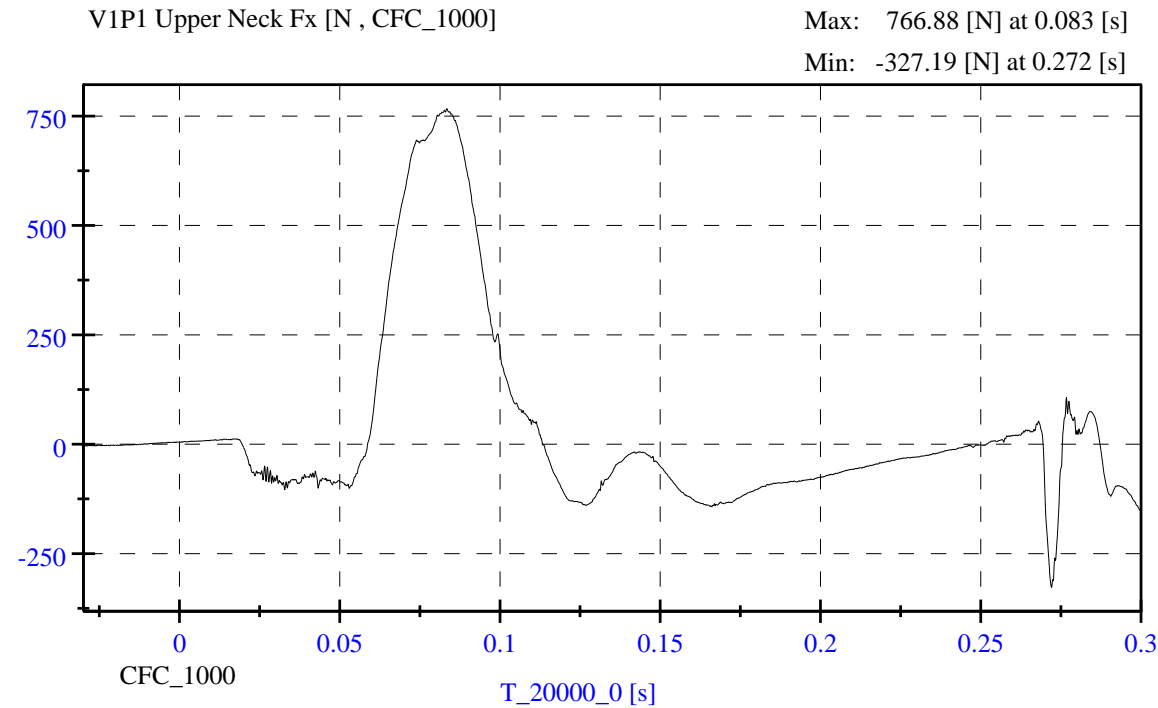
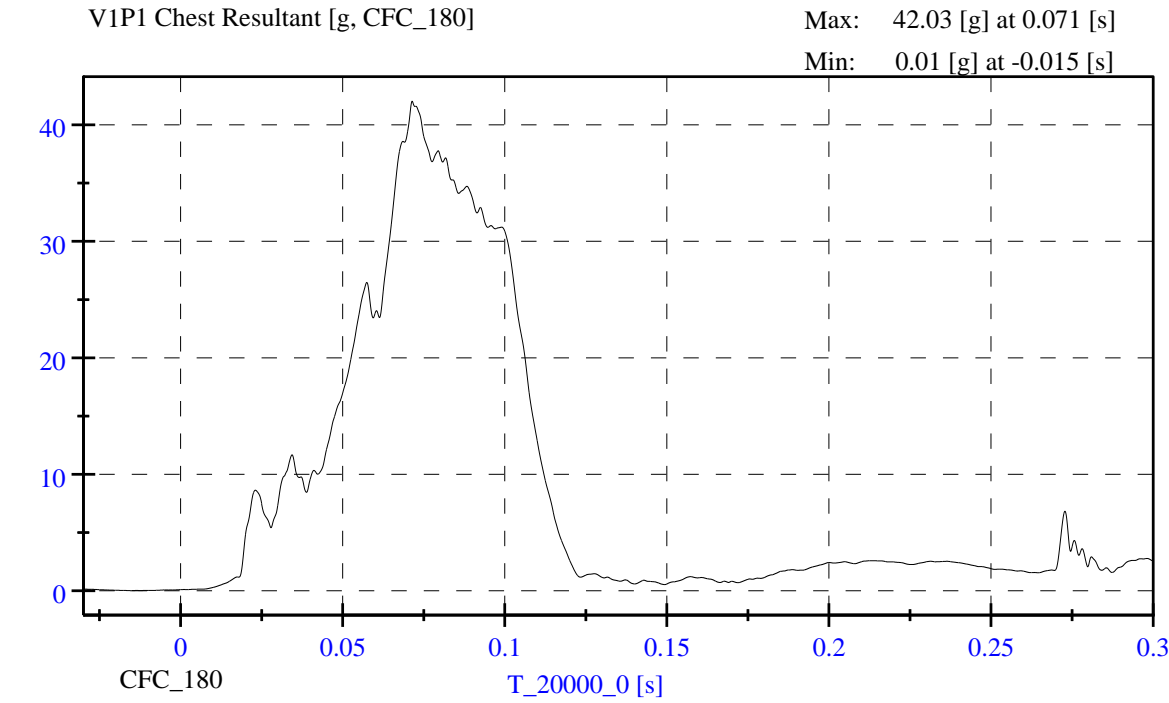




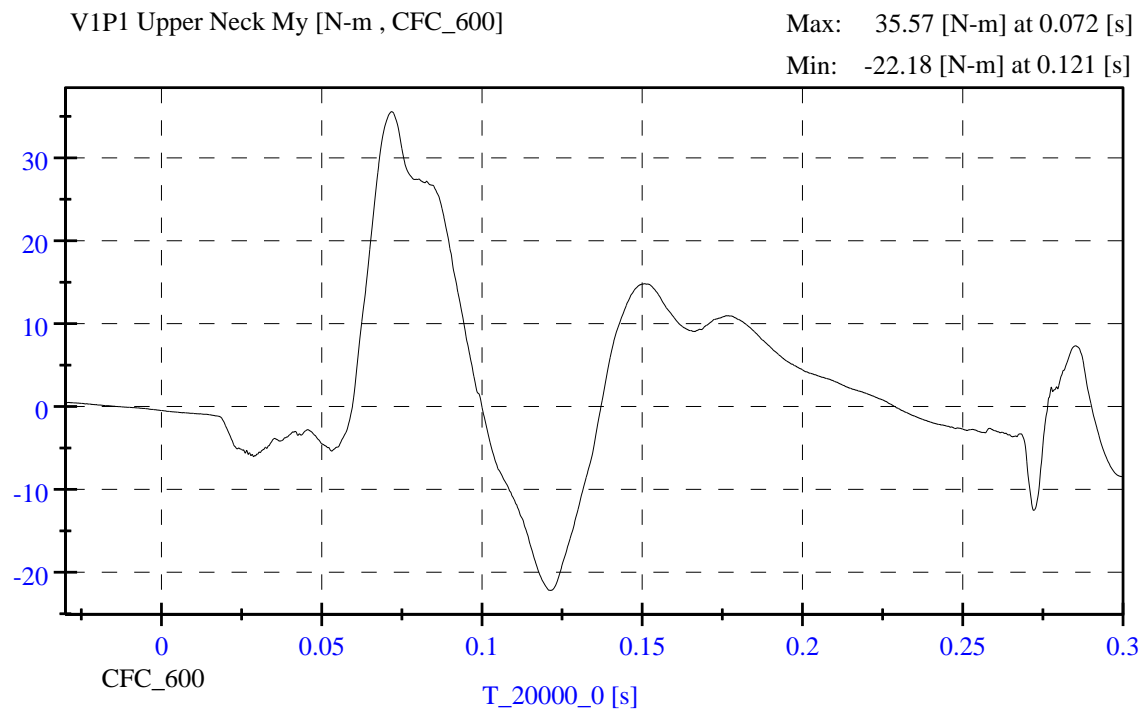
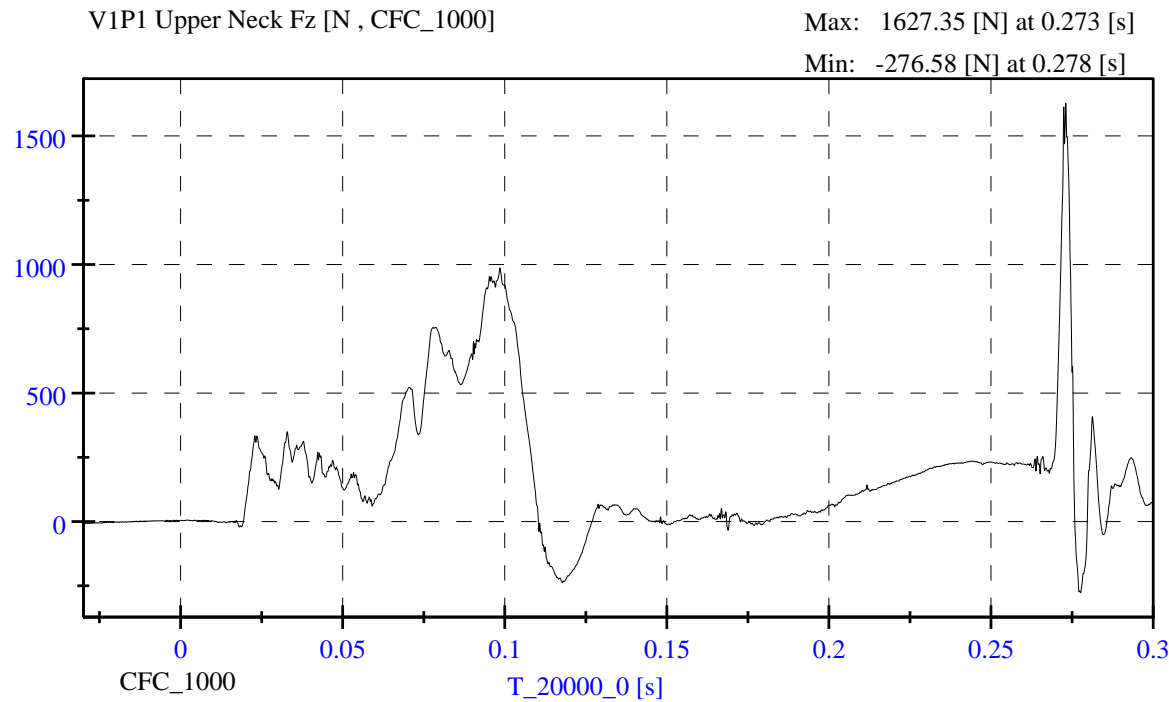


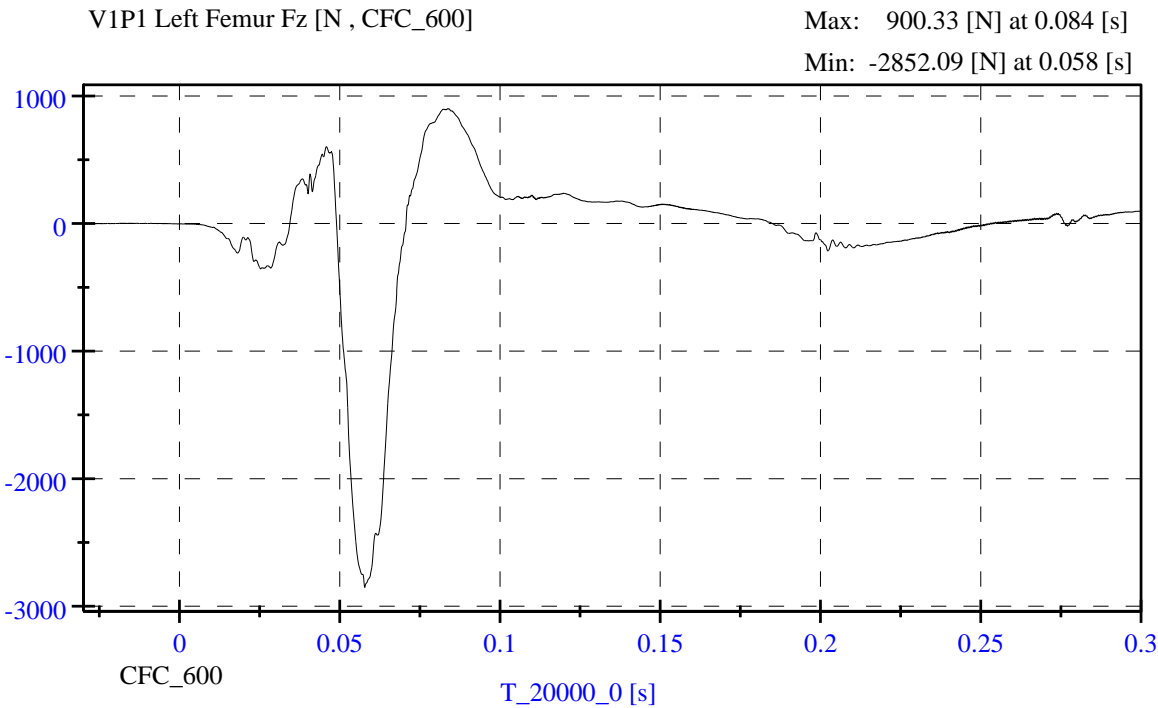
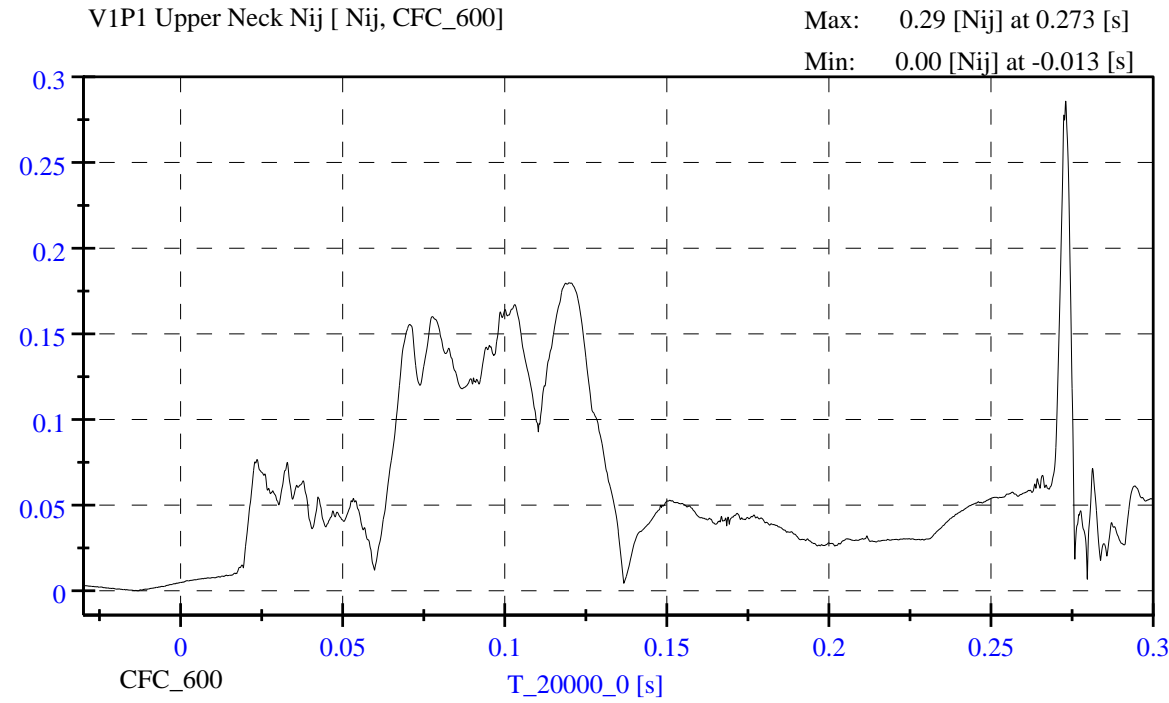


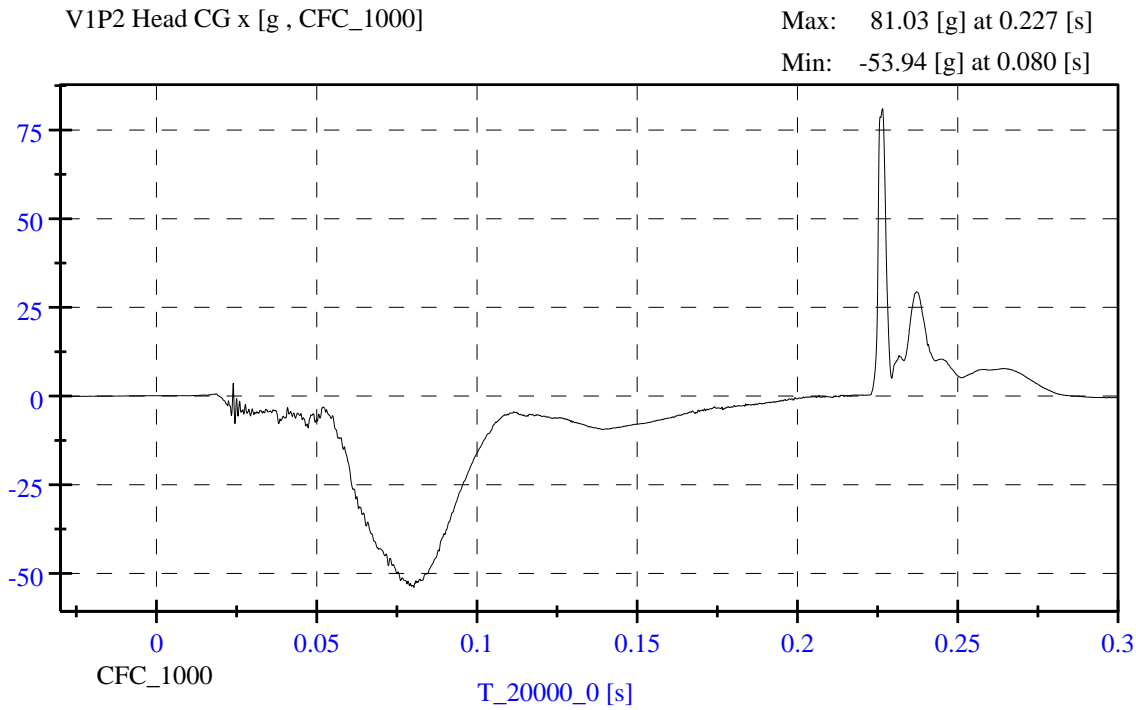
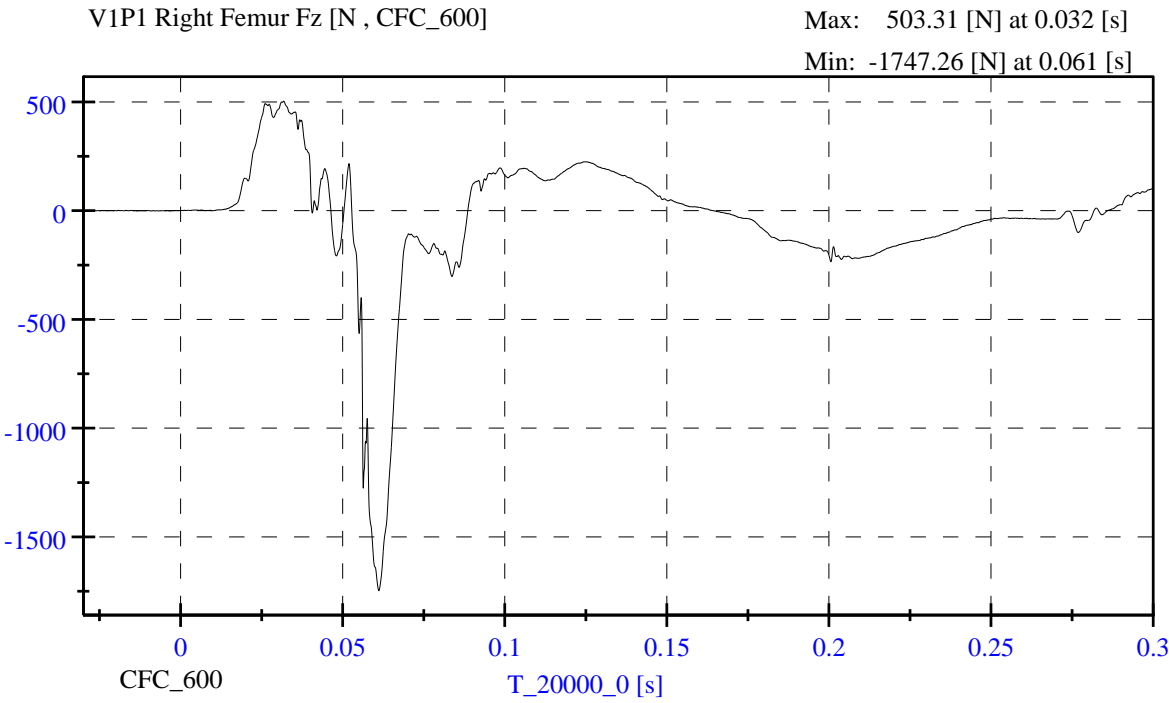




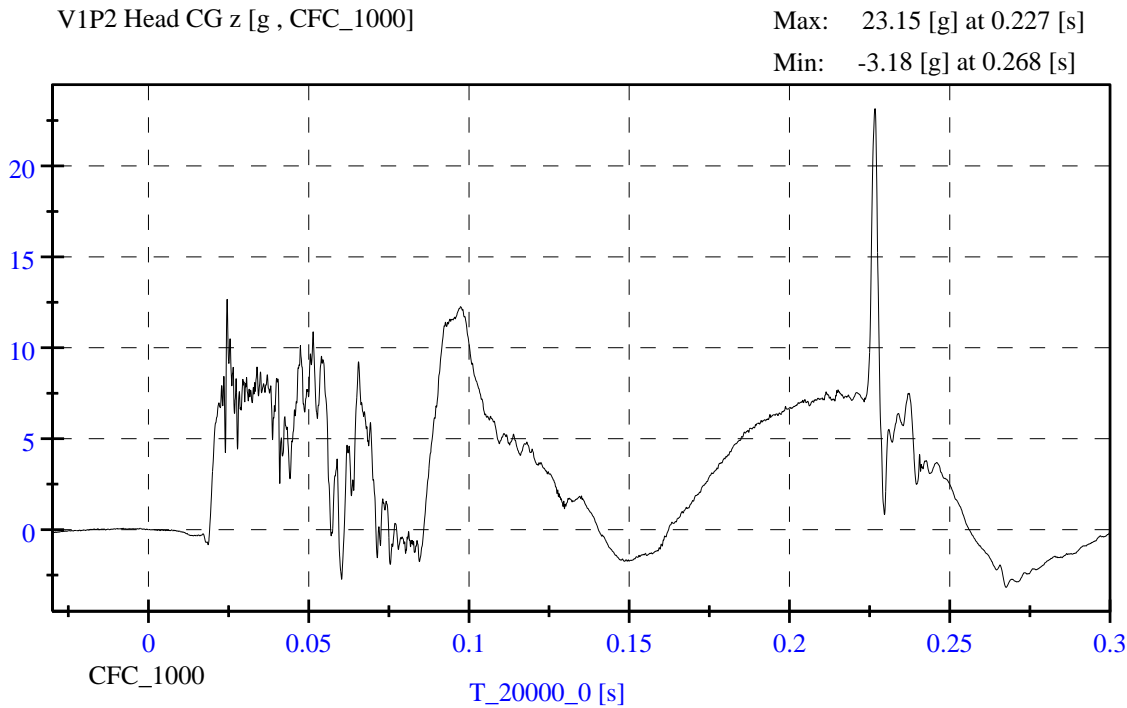
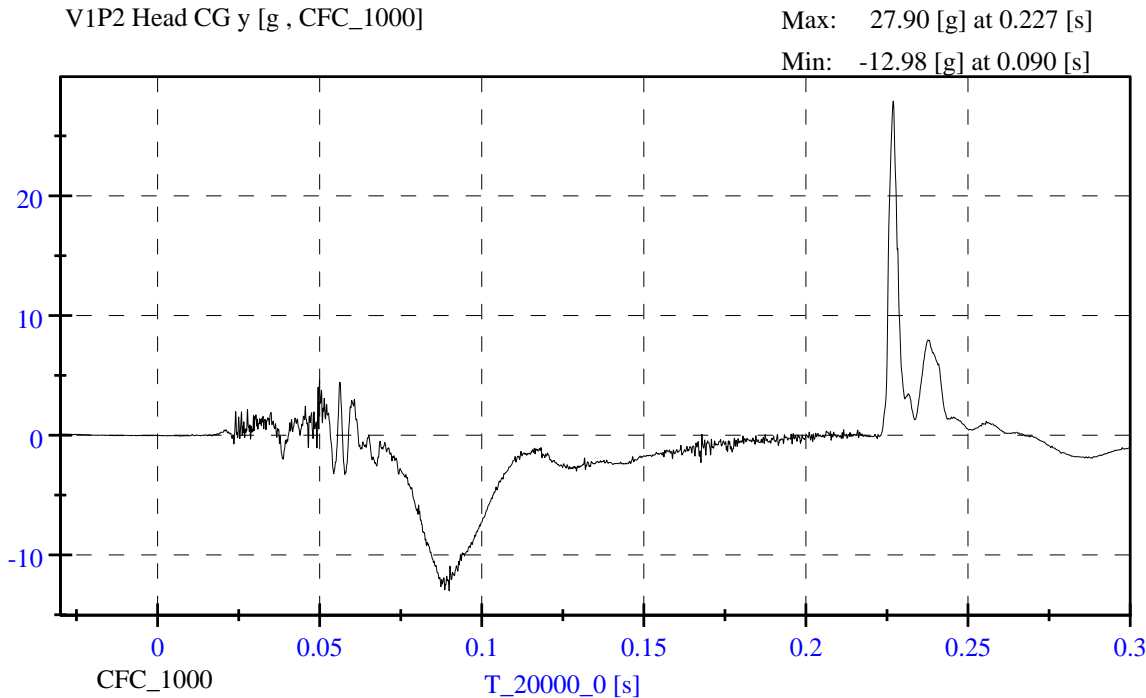


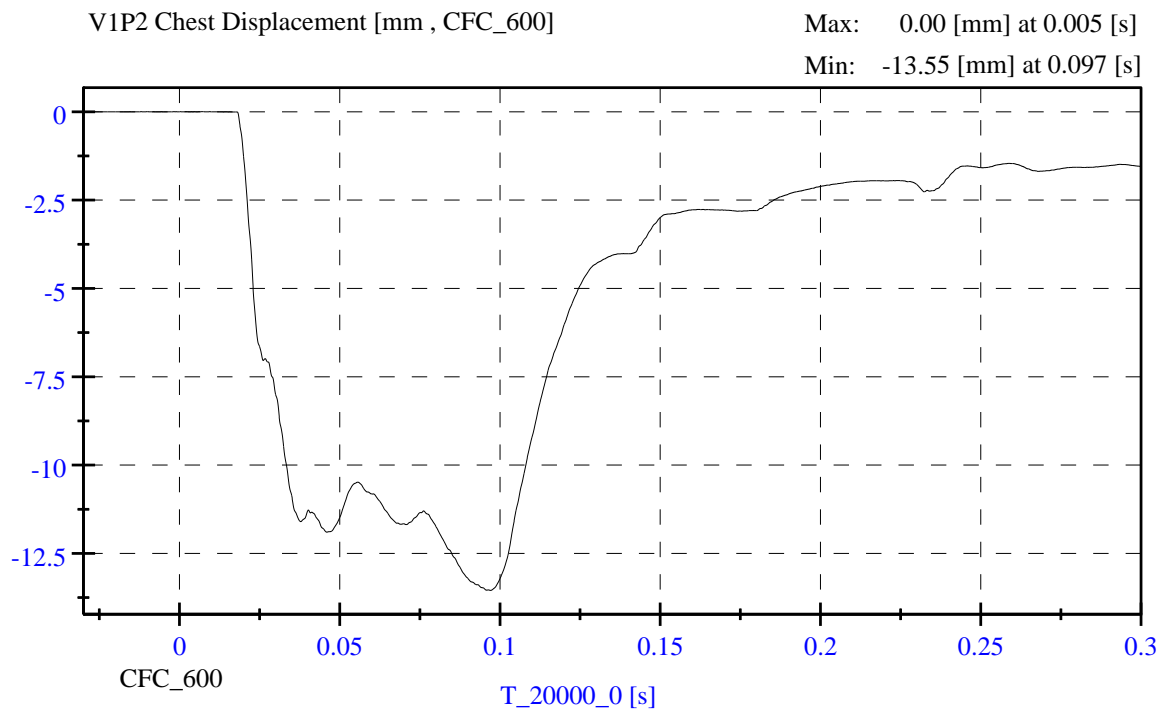
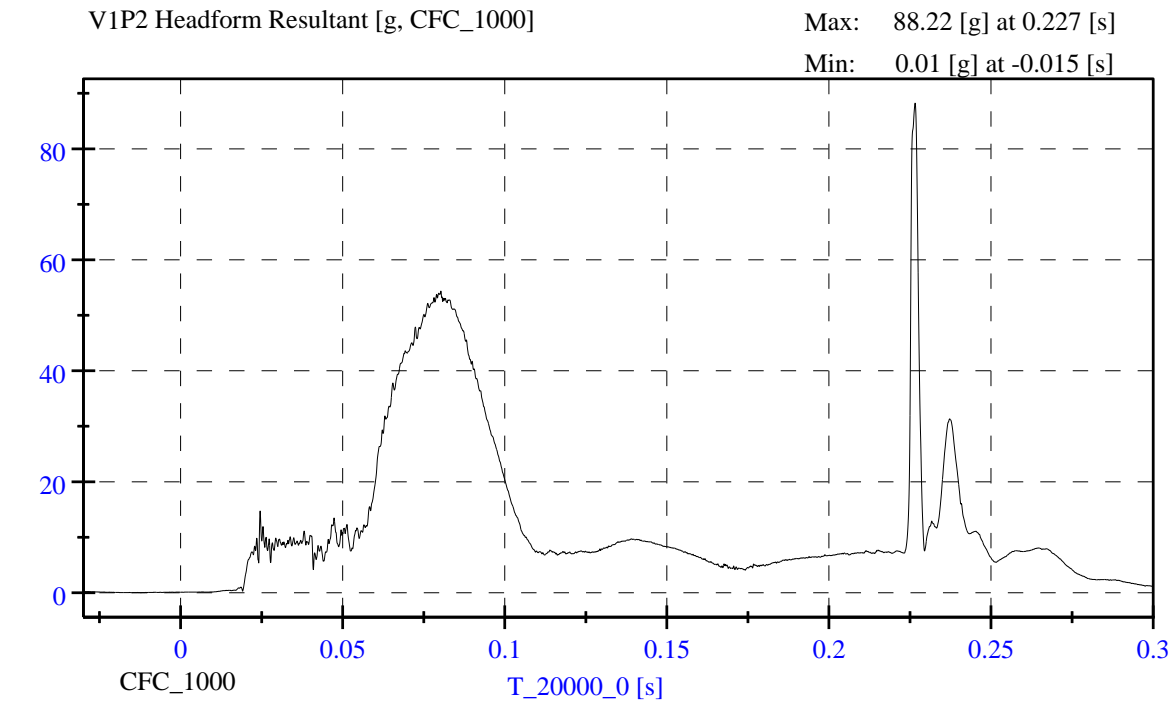


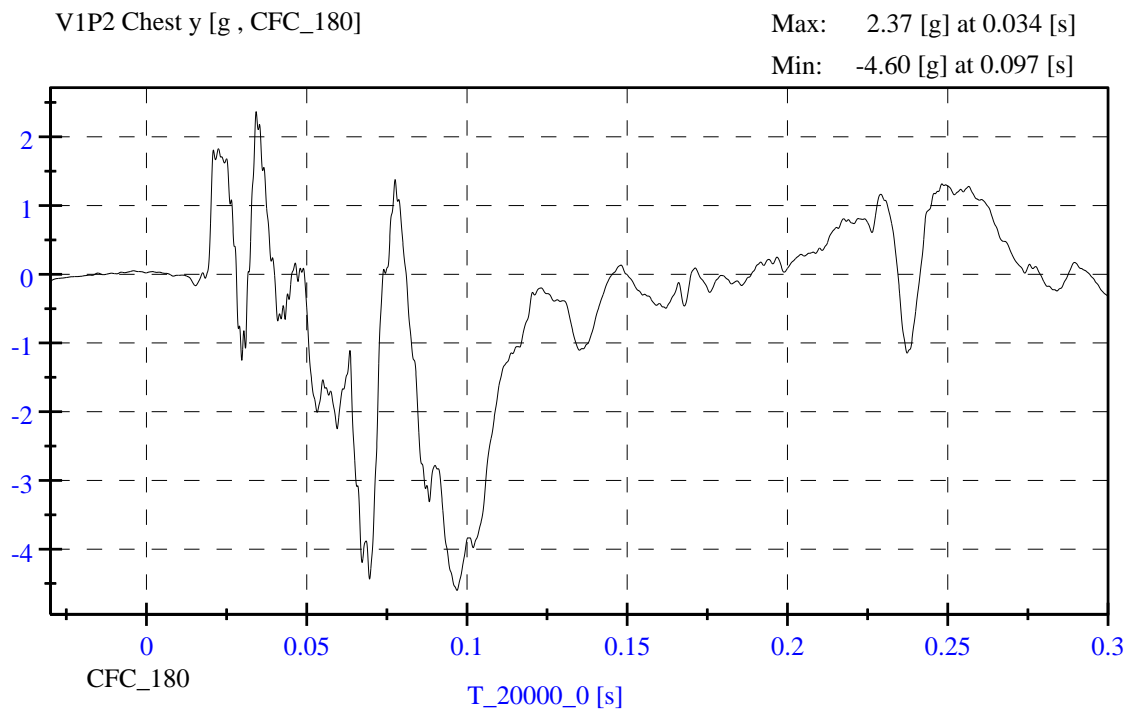
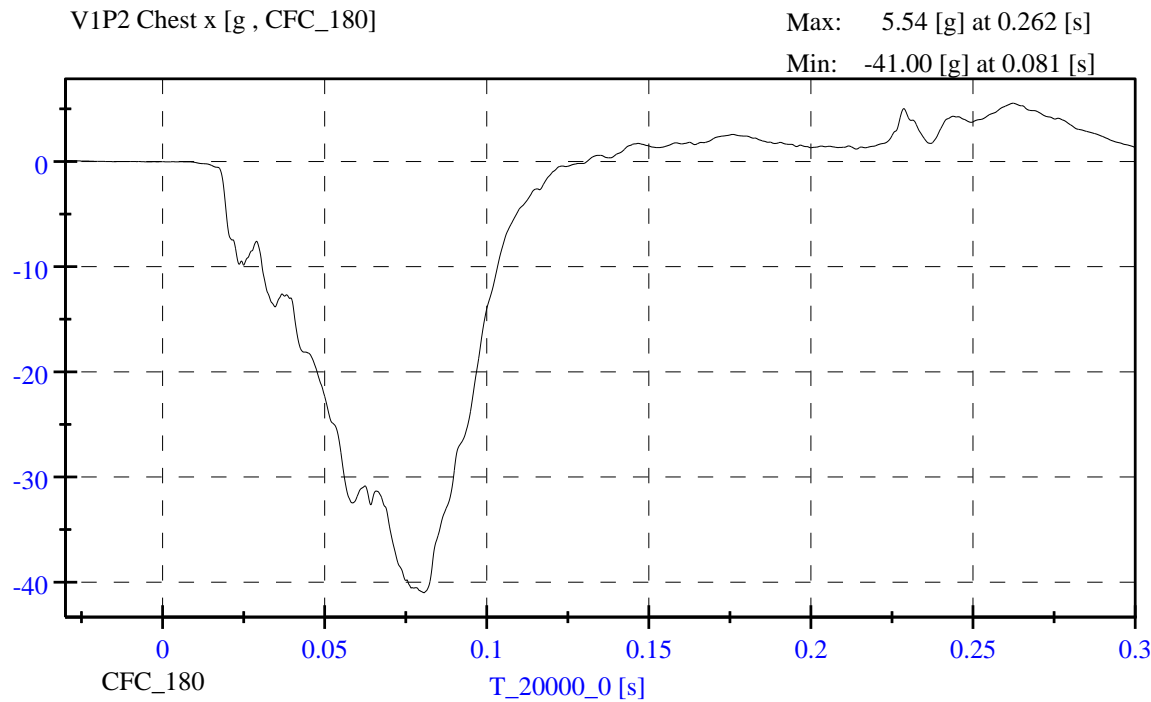




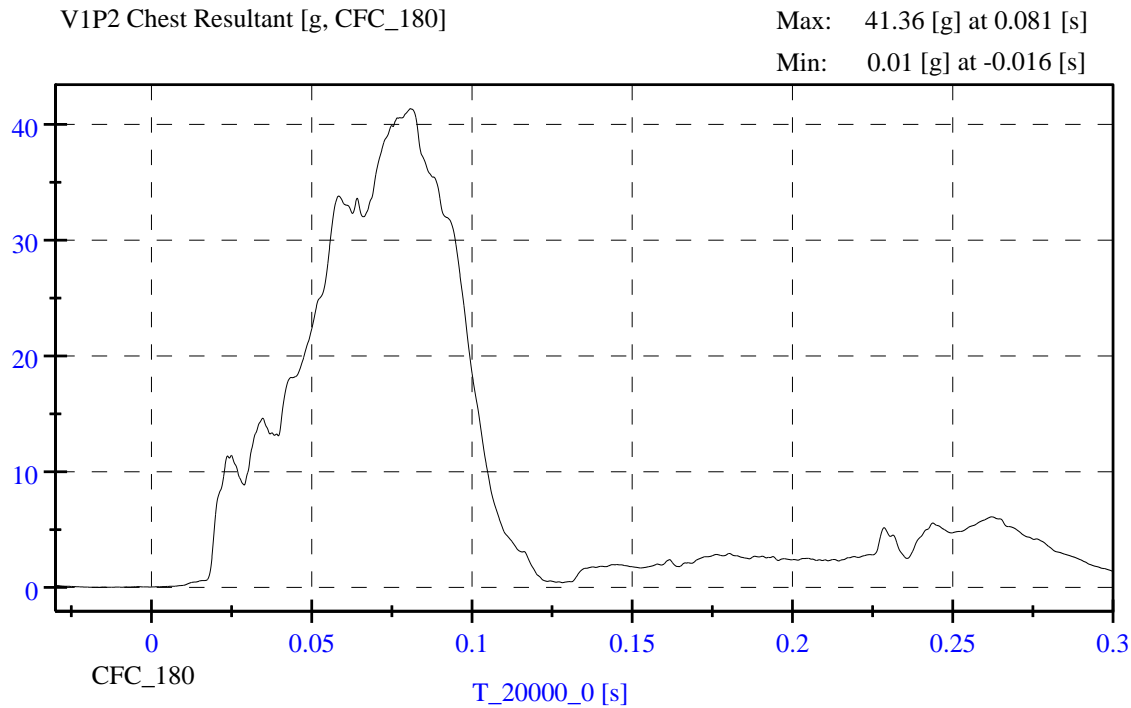
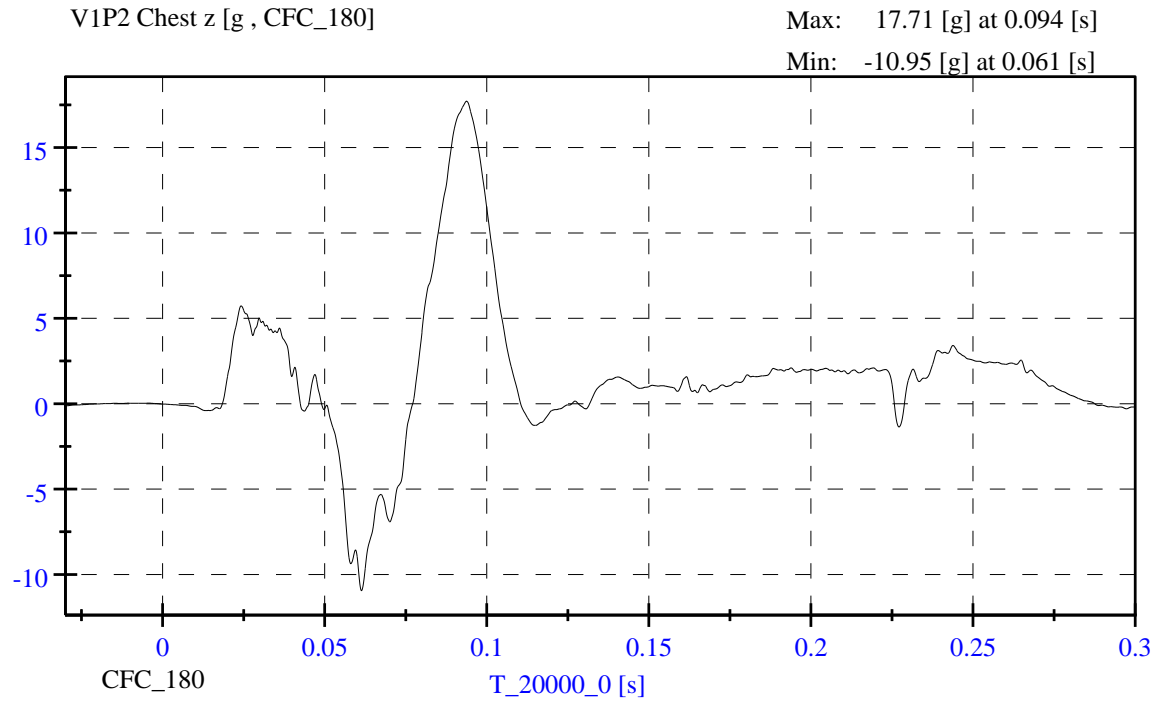


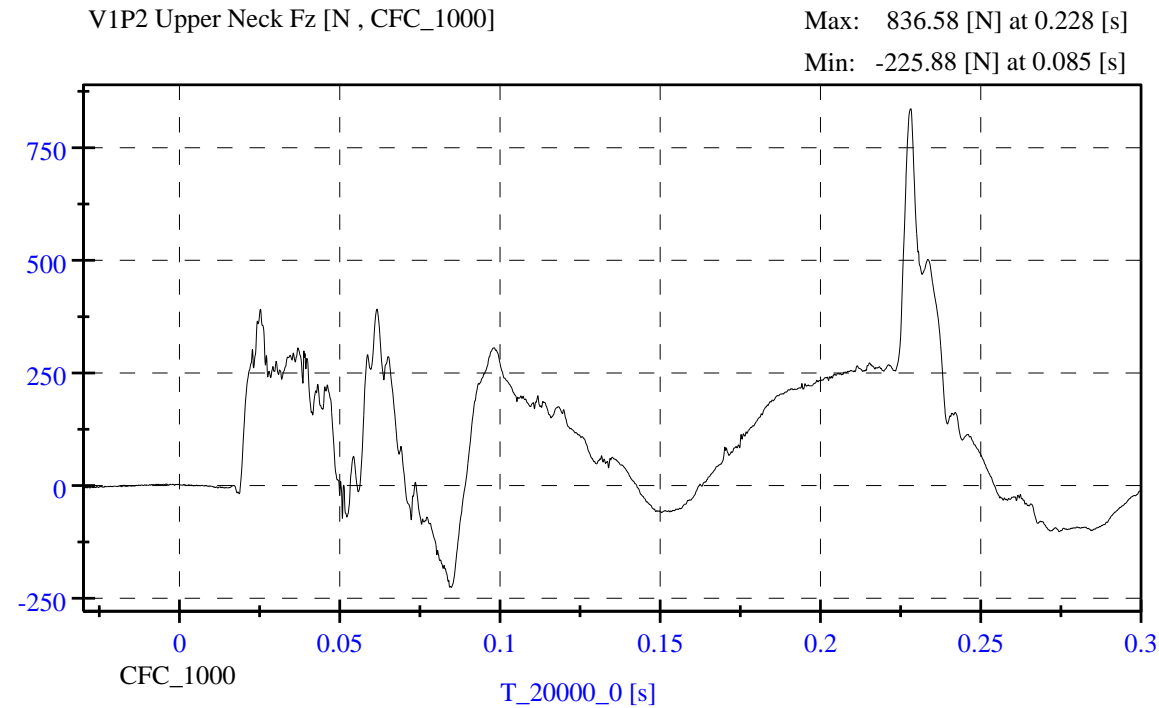
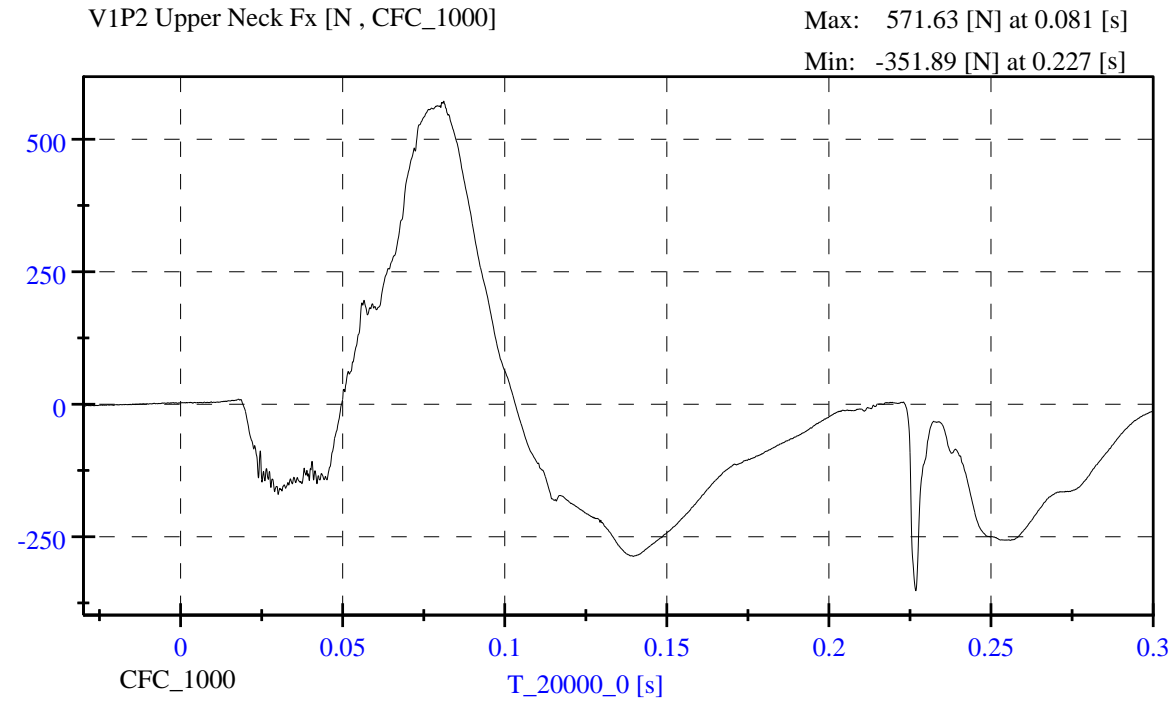


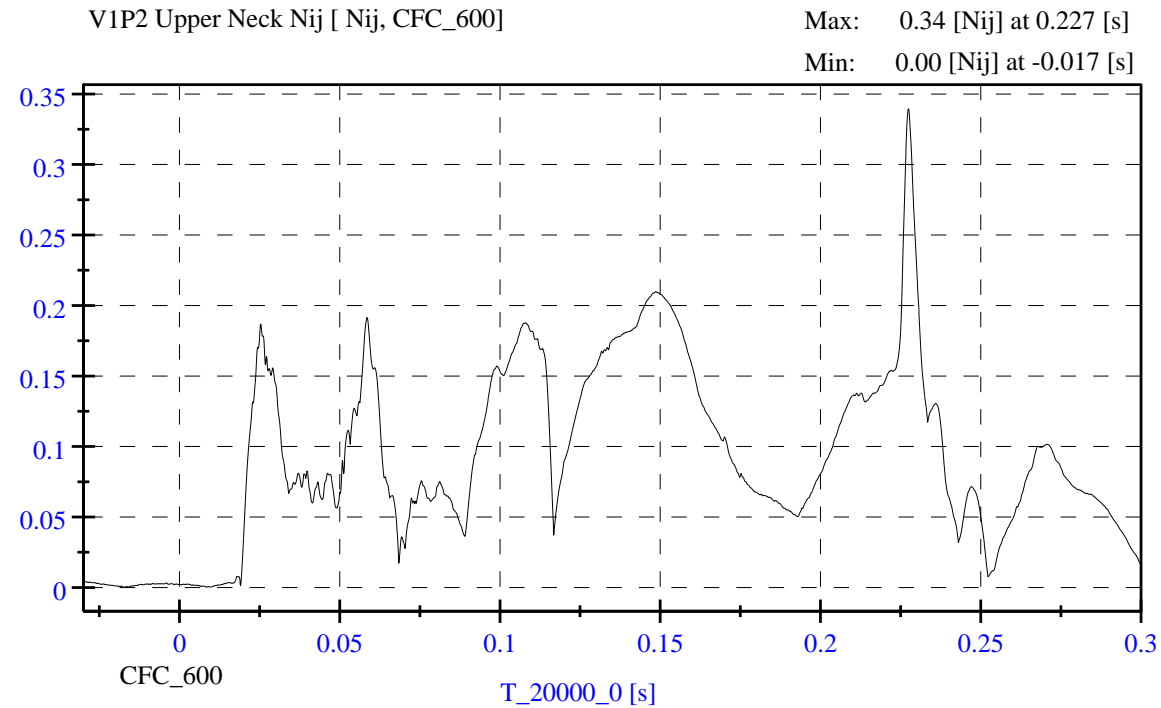
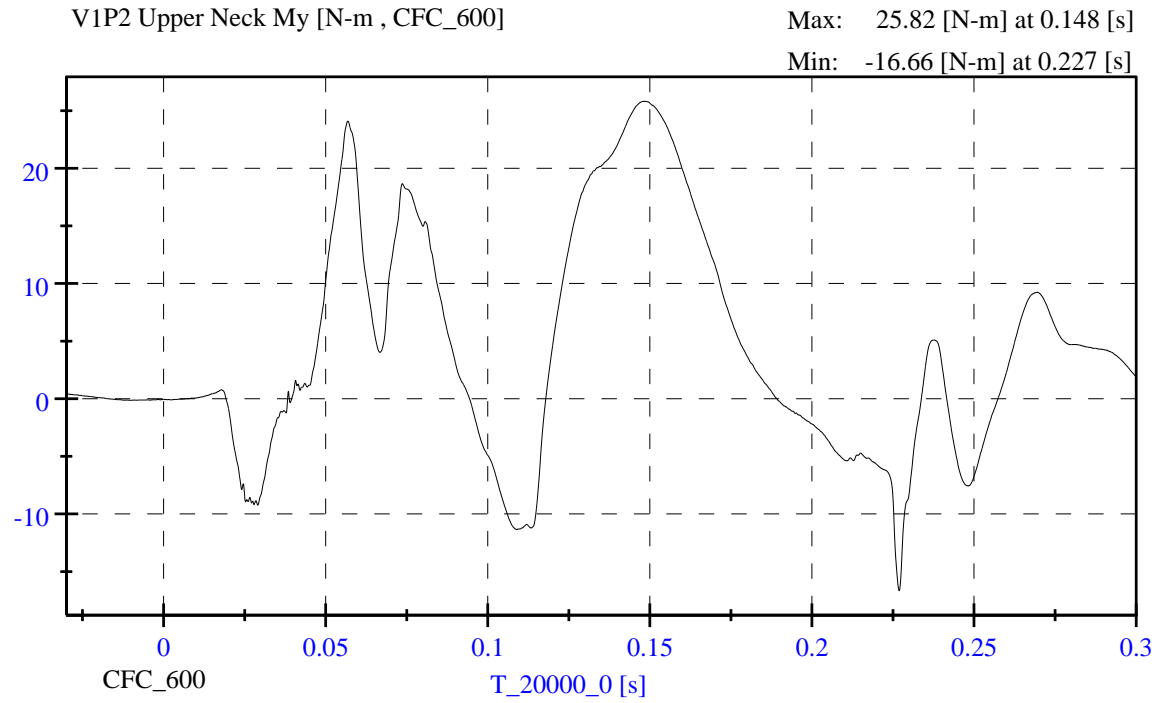


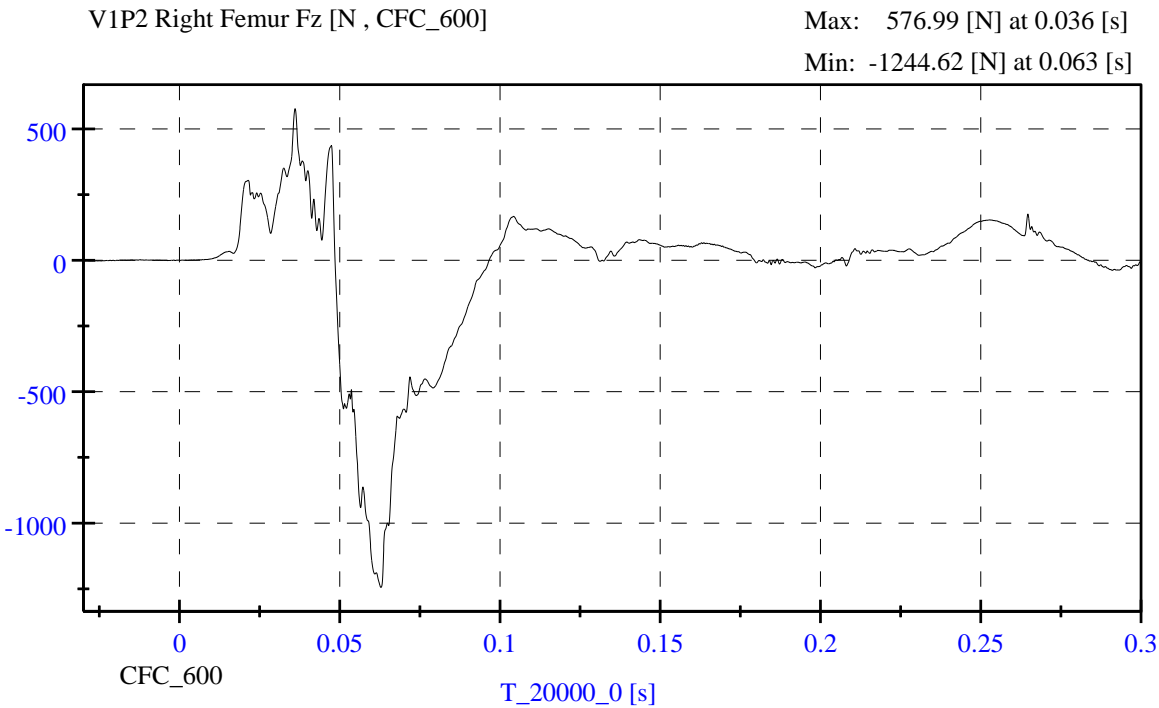
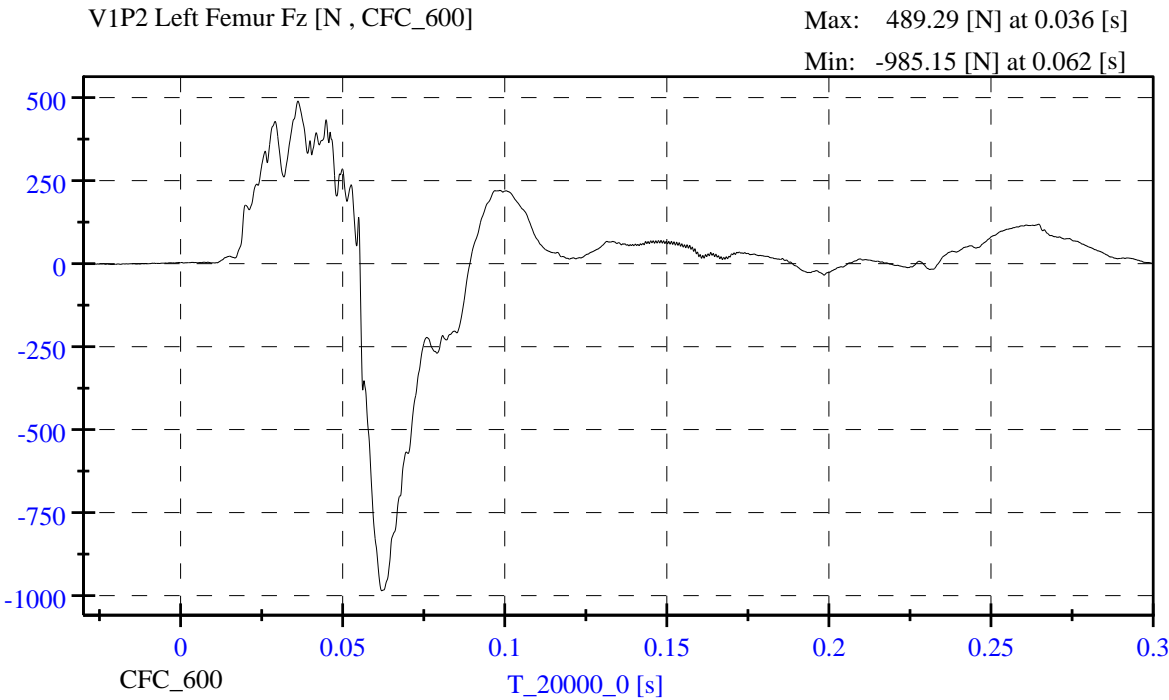














## **APPENDIX C**

### **DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA**

## **CALIBRATION TEST RESULTS**

### **PRE-TEST**

**HYBRID III 50<sup>TH</sup> PERCENTILE MALE - DRIVER ATD**

**SERIAL NO: 061**



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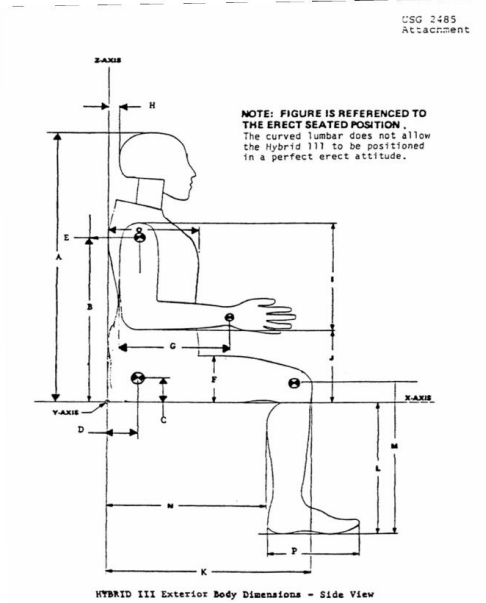
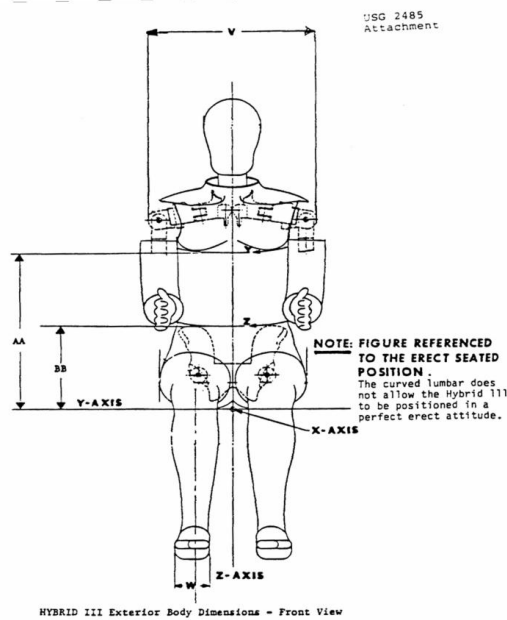
## 50<sup>th</sup> Male External Measurements

SN 061

Symbol	Description	Specification	Results	Pass
		in	in	
A	Sitting Height	34.6 - 35	34.9	Yes
B	Shoulder Pivot Height	19.9 - 20.5	20.2	Yes
C	H-Point Height	3.3 - 3.5	3.3	Yes
D	H-Point from Backline	5.3 - 5.5	5.4	Yes
E	Shoulder Pivot from Backline	3.3 - 3.7	3.5	Yes
F	Thigh Clearance	5.5 - 6.1	6.0	Yes
G	Back of Elbow to Wrist Pivot	11.4 - 12.0	11.6	Yes
H	Head Back to Backline	1.6 - 1.8	1.7	Yes
I	Shoulder to Elbow Length	13.0 - 13.6	13.3	Yes
J	Elbow Rest Height	7.5 - 8.3	8.0	Yes
K	Buttock to Knee Length	22.8 - 23.8	23.7	Yes
L	Popliteal Height	16.9 - 17.9	16.9	Yes
M	Knee Pivot Height	19.1 - 19.7	19.2	Yes
N	Buttock Popliteal Length	17.8 - 18.8	18.6	Yes
O	Chest Depth without Jacket	8.4 - 9.0	8.7	Yes
P	Foot Length (right)	9.9 - 10.5	10.2	Yes
V	Shoulder Breadth	16.3 - 17.2	16.7	Yes
W	Foot Breadth	3.6 - 4.2	4.0	Yes
Y	Chest Circumference with Jacket	38.2 - 39.4	38.8	Yes
Z	Waist Circumference	32.9 - 34.1	33.7	Yes
AA	Reference Location (Chest Circumference)	16.9 - 17.1	16.9	Yes
BB	Reference Location (Waist Circumference)	8.9 - 9.1	9.0	Yes

Technician: SPZ

Date: 11/8/2012







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### VERIFICATION REPORT

Test Name:	Head Drop	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:		Test Date:	11/7/2012
Test Number:	1	Test Time:	2:16:47 PM

Component Part Number	Component Serial Number
Head Skin - 78051-228	02-20544

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.6 deg C P
Humidity	10 -- 70	25 %RH P
Resultant Acceleration	225 -- 275	251 g P
Oscillation	0.0 -- 10.0	0.0 % P
Lateral Acceleration	-15.00 -- 15.00	-1.87 g P

All test parameters are within specifications

Technician: S. Zito

Supervisor: D. Travale

Test Time: 2:16:47 PM

Test Date: 11/7/2012

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**VERIFICATION REPORT**

## REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P58904	5/18/2012
Endevco	7264-2000	P58911	5/18/2012
Endevco	7264-2000	P58757	5/18/2012

Test Time: **2:16:47 PM**Test Date: **11/7/2012**

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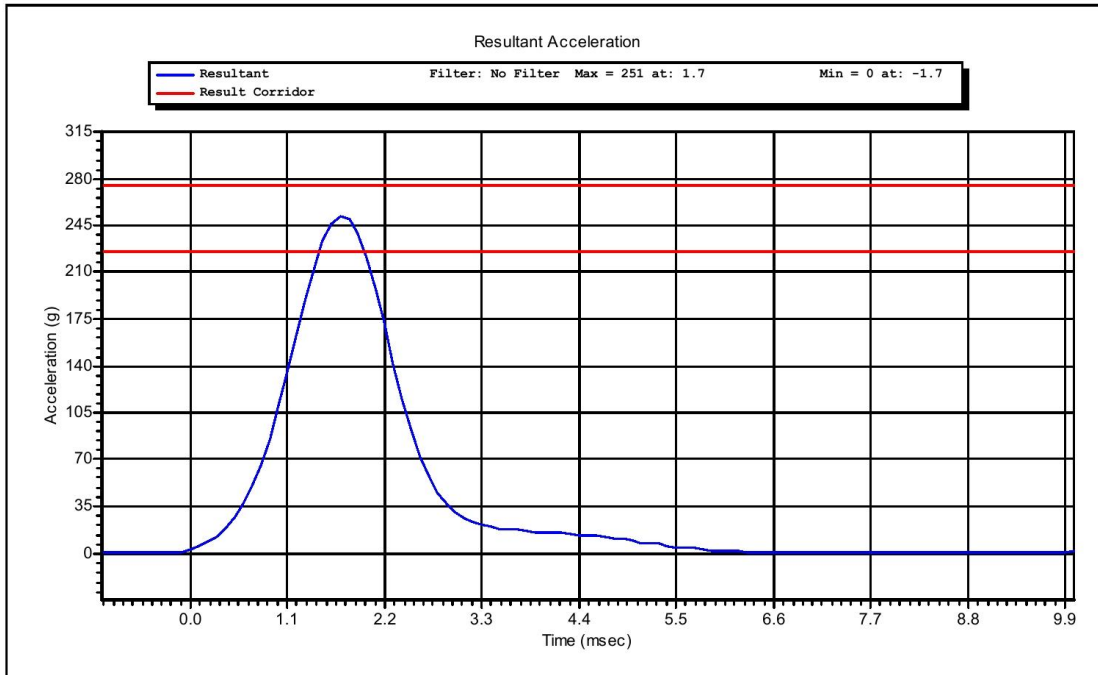


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Test Name:	Head Drop	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:		Test Date:	11/7/2012
Test Number:	1	Test Time:	2:16:47 PM

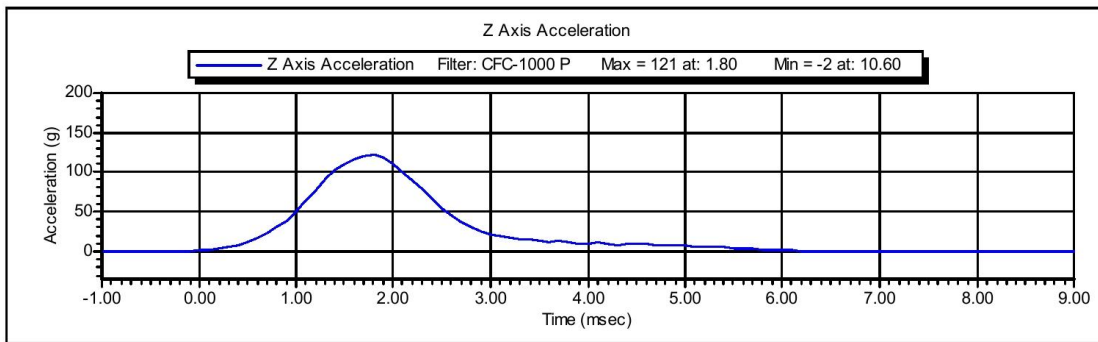
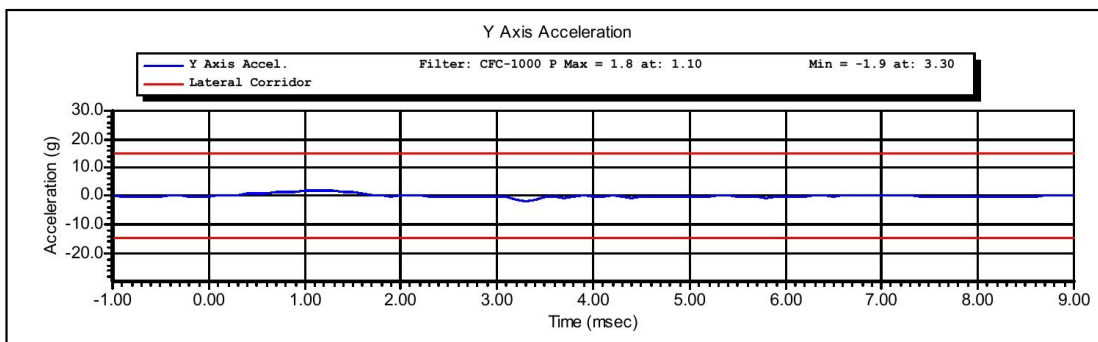
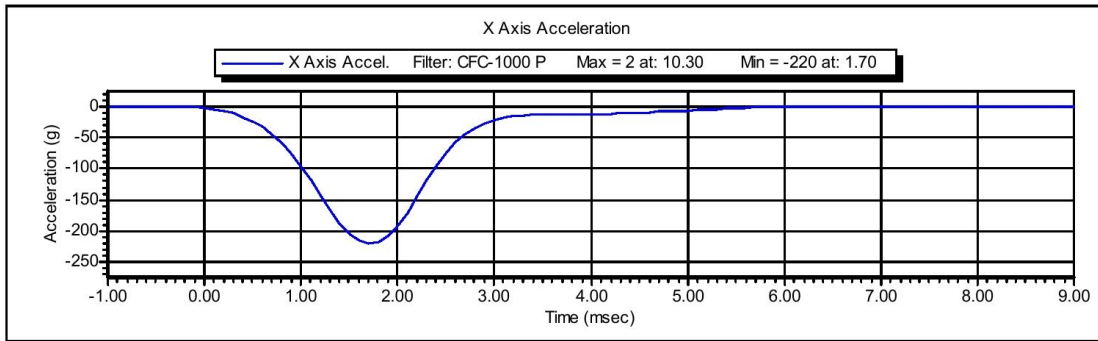


Test Time: 2:16:47 PM

Test Date: 11/7/2012

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Test Time: **2:16:47 PM**

Test Date: **11/7/2012**

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### VERIFICATION REPORT

Test Name:	<b>Neck Flexion</b>	Revision:	<b>10/1/2001</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>Hybrid III 50'th</b>		
ATD Serial Number:	<b>061</b>		
Test ID:		Test Date:	<b>11/8/2012</b>
Test Number:	<b>1</b>	Test Time:	<b>9:21:39 AM</b>

Component Part Number	Component Serial Number
<b>Neck - 78051-336</b>	<b>4194</b>
<b>Head Skin - 78051-220</b>	<b>02-20544</b>

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	<b>21.4</b> deg C	P
Humidity		10	-- 70	<b>23</b> %RH	P
Velocity		6.89	-- 7.13	<b>7.11</b> m/s	P
Pendulum Deceleration at	10 ms	22.5	-- 27.5	<b>25.7</b> g	P
Pendulum Deceleration at	20 ms	17.6	-- 22.6	<b>21.1</b> g	P
Pendulum Deceleration at	30 ms	12.5	-- 18.5	<b>17.0</b> g	P
Max Pendulum Deceleration After	30 ms	0.0	-- 29.0	<b>17.0</b> g	P
Deceleration time to	5 g	34.0	-- 42.0	<b>36.8</b> ms	P
D Plane Rotation		-78.0	-- -64.0	<b>-77.9</b> degrees	P
Time at max rotation		57.0	-- 64.0	<b>59.8</b> ms	P
Rotation Decay to Zero		113.0	-- 128.0	<b>117.9</b> ms	P
Moment about OC		88.1	-- 108.4	<b>97.9</b> Nm	P
Time at Max Moment		47.0	-- 58.0	<b>47.6</b> ms	P
Moment Decay to Zero		97.0	-- 107.0	<b>98.7</b> ms	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test Time: **9:21:39 AM**

Test Date: **11/8/2012**

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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2012
Endevco	7231CT	C15016	8/15/2012
DentonATD	78051-342	PENDULUM POT	1/25/2012
DentonATD	78051-342	CONDYLE POT	1/25/2012
Denton	IF-205	LC-175 My	5/21/2012
Denton	IF-205	LC-175 Fx	5/21/2012

Test Time: 9:21:39 AM

Test Date: 11/8/2012

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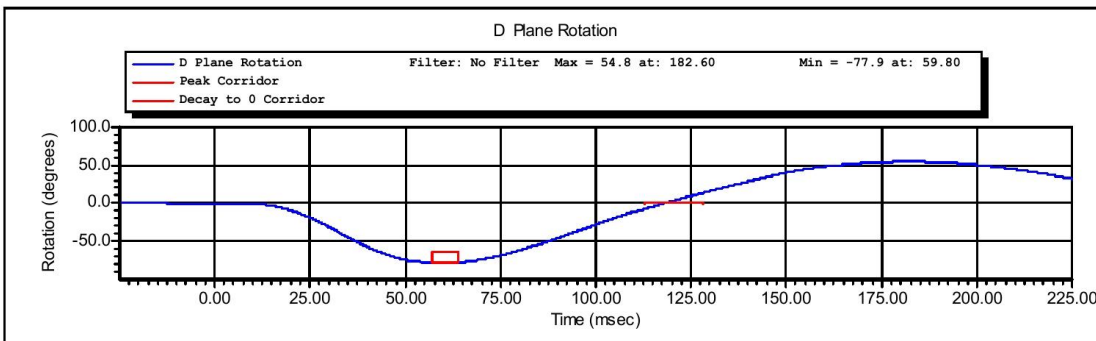
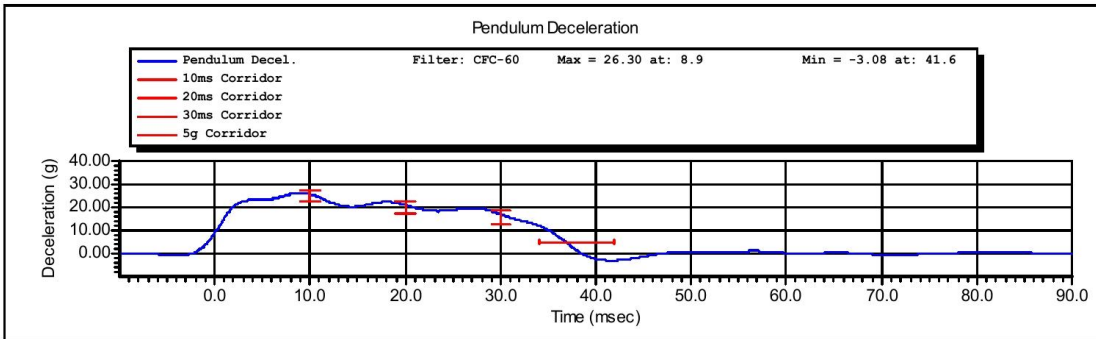


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Name of Test:	Neck Flexion	REVISION:	10/1/2001
Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:	061		
ID of Test:		Date:	11/8/2012
Number of Test:	1	Time of Test:	9:21:39 AM

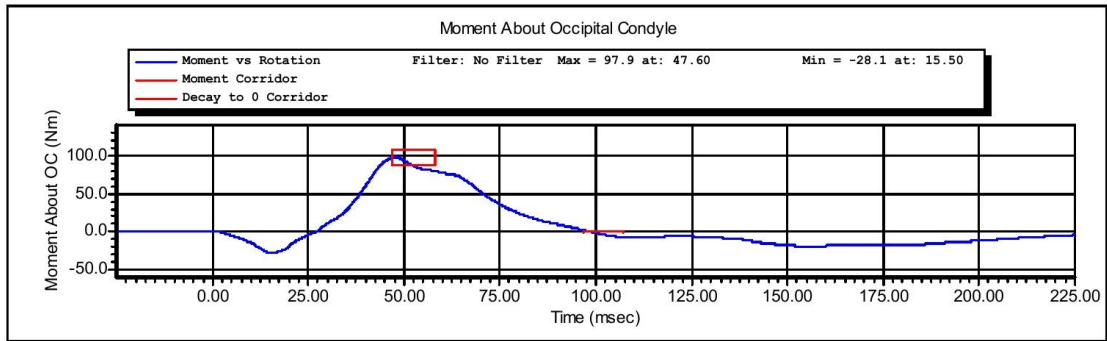


Time of Test: 9:21:39 AM

Date of Test: 11/8/2012

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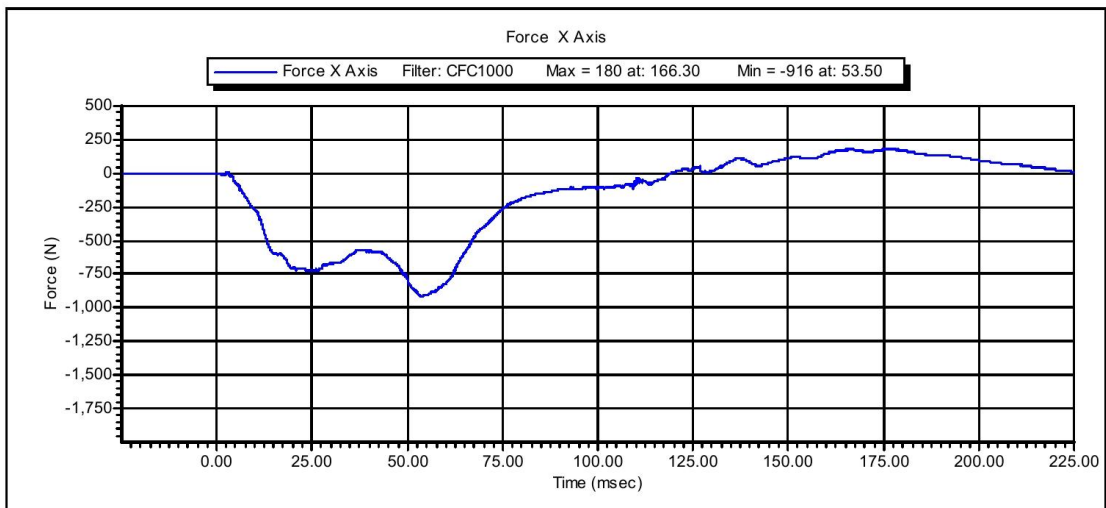
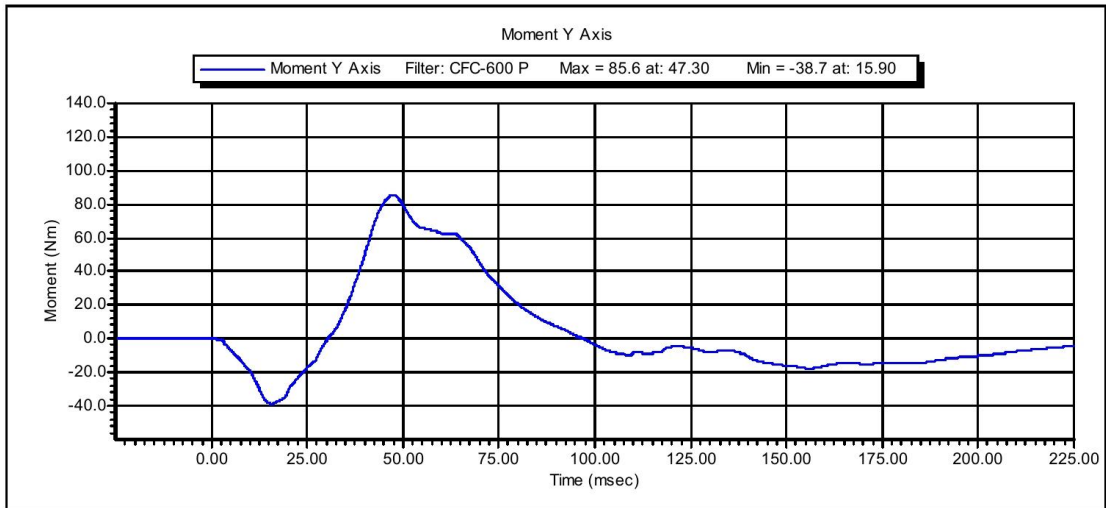




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Date of Test: **11/8/2012**

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Time of Test: **9:21:39 AM**

Date of Test: **11/8/2012**

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**VERIFICATION REPORT**

Test Name:	<b>Neck Extension</b>	Revision:	<b>10/1/2001</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>Hybrid III 50'th</b>		
ATD Serial Number:	<b>061</b>		
Test ID:		Test Date:	<b>11/8/2012</b>
Test Number:	<b>1</b>	Test Time:	<b>10:28:22 AM</b>

Component Part Number	Component Serial Number
<b>Neck - 78051-336</b>	<b>4194</b>
<b>Head Skin - 78051-220</b>	<b>02-20544</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>21.8</b> deg C P
Humidity	10 -- 70	<b>24</b> %RH P
Velocity	5.94 -- 6.19	<b>6.12</b> m/s P
Pendulum Deceleration at 10 ms	17.2 -- 21.2	<b>19.0</b> g P
Pendulum Deceleration at 20 ms	14.0 -- 19.0	<b>17.3</b> g P
Pendulum Deceleration at 30 ms	11.0 -- 16.0	<b>13.8</b> g P
Max Pendulum Deceleration after 30 ms	0.0 -- 22.0	<b>13.8</b> g P
Decel Time to 5 g	38.0 -- 46.0	<b>39.2</b> ms P
D Plane Rotation	81.0 -- 106.0	<b>101.5</b> degrees P
Time at Max Rotation	72.0 -- 82.0	<b>77.2</b> ms P
Rotation Decay to Zero	147.0 -- 174.0	<b>159.5</b> ms P
Moment About Occipital Condyle	-80.0 -- -52.9	<b>-69.8</b> Nm P
Time at Max Moment	65.0 -- 79.0	<b>72.3</b> ms P
Moment Decay to Zero	120.0 -- 148.0	<b>140.8</b> ms P

All test parameters are within specifications

 Technician: **S. Zito**

 Supervisor: **D. Travale**

 Test Time: **10:28:22 AM**

 Test Date: **11/8/2012**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2012
Endevco	7231CT	C15016	8/15/2012
DentonATD	78051-342	PENDULUM POT	1/25/2012
DentonATD	78051-342	CONDYLE POT	1/25/2012
Denton	IF-205	LC-175 My	5/21/2012
Denton	IF-205	LC-175 Fx	5/21/2012

Test Time: 10:28:22 AM

Test Date: 11/8/2012

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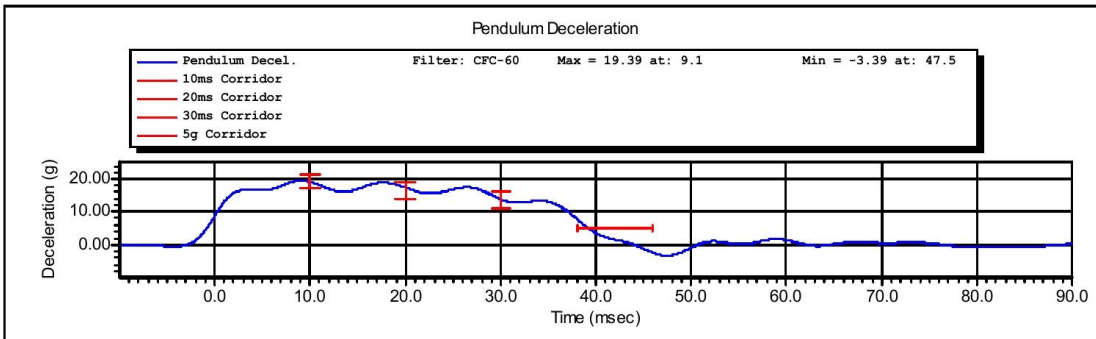
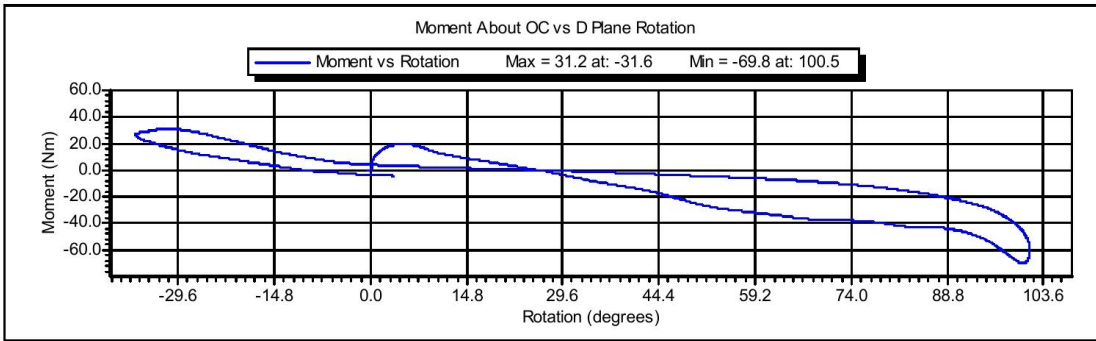


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Name of Test:	Neck Extension	REVISION:	10/1/2001
Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:	061		
ID of Test:		Date:	11/8/2012
Number of Test:	1	Time of Test:	10:28:22 AM



Time of Test: 10:28:22 AM

Date of Test: 11/8/2012

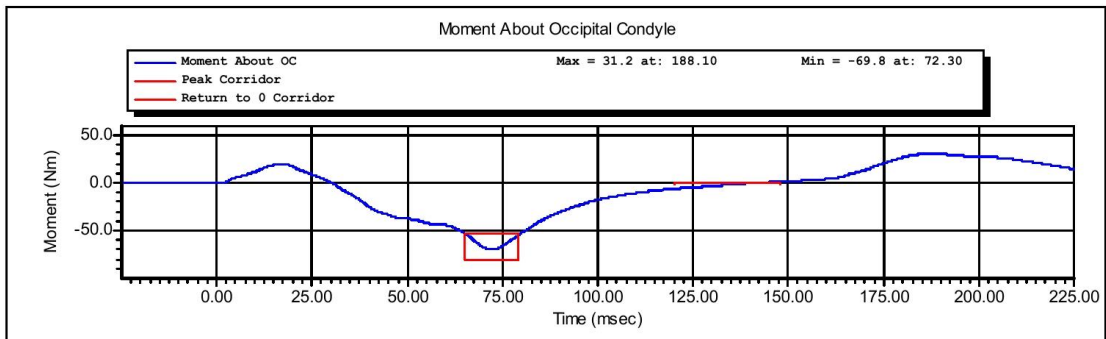
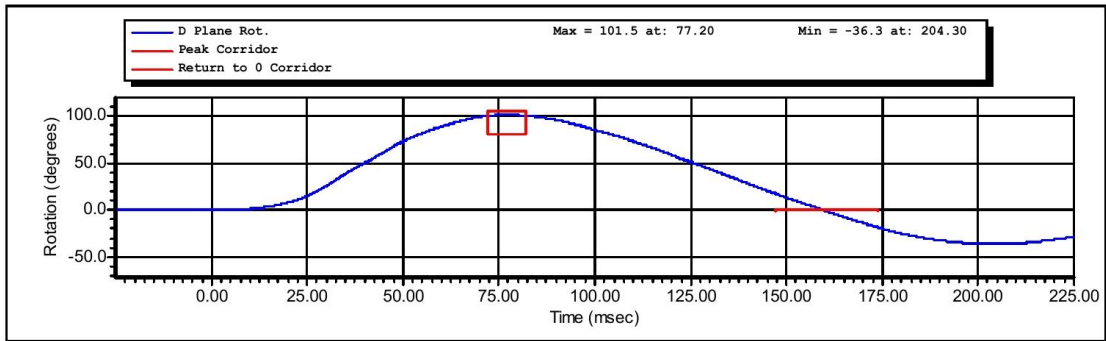
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Time of Test: 10:28:22 AM

Date of Test: 11/8/2012

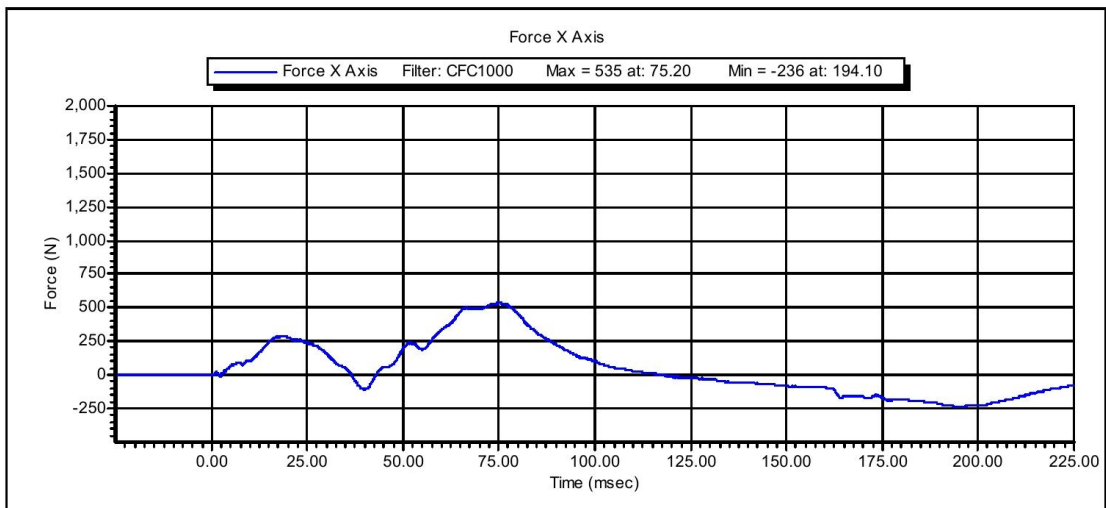
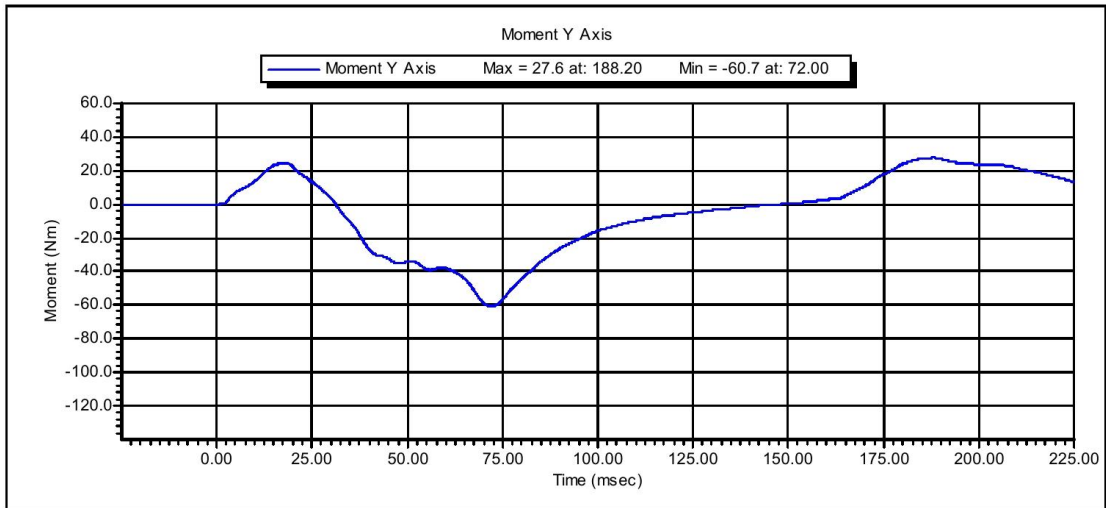
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Time of Test: 10:28:22 AM

Date of Test: 11/8/2012

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**VERIFICATION REPORT**

Test Name:	<b>Thorax Impact</b>	Revision:	<b>10/1/2001</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>Hybrid III 50'th</b>		
ATD Serial Number:	<b>061</b>		
Test ID:	<b>Thorax</b>	Test Date:	<b>11/7/2012</b>
Test Number:	<b>2</b>	Test Time:	<b>8:42:49 AM</b>

Component Part Number	Component Serial Number
<b>Chest Jacket - 78051-169</b>	<b>2437</b>
<b>Lumbar Spine - 78051-66</b>	<b>555</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>20.8</b> deg C P
Humidity	10.0 -- 70.0	<b>18.4</b> %RH P
Velocity	6.59 -- 6.83	<b>6.63</b> m/s P
Resistive Force	-5.894 -- -5.160	<b>-5.583</b> kN P
Sternum Displacement	-72.6 -- -63.5	<b>-65.3</b> mm P
Hysteresis	69 -- 85	<b>72</b> % P

All test parameters are within specifications

Technician: **M. Goehle**  
 Supervisor: **D. Travale**

Test Time: **8:42:49 AM**

Test Date: **11/7/2012**





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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2012
Endevco	7231CT	C14953	5/25/2012
DentonATD	78051-342	DS-061	5/17/2012

Test Time: 8:42:49 AM

Test Date: 11/7/2012

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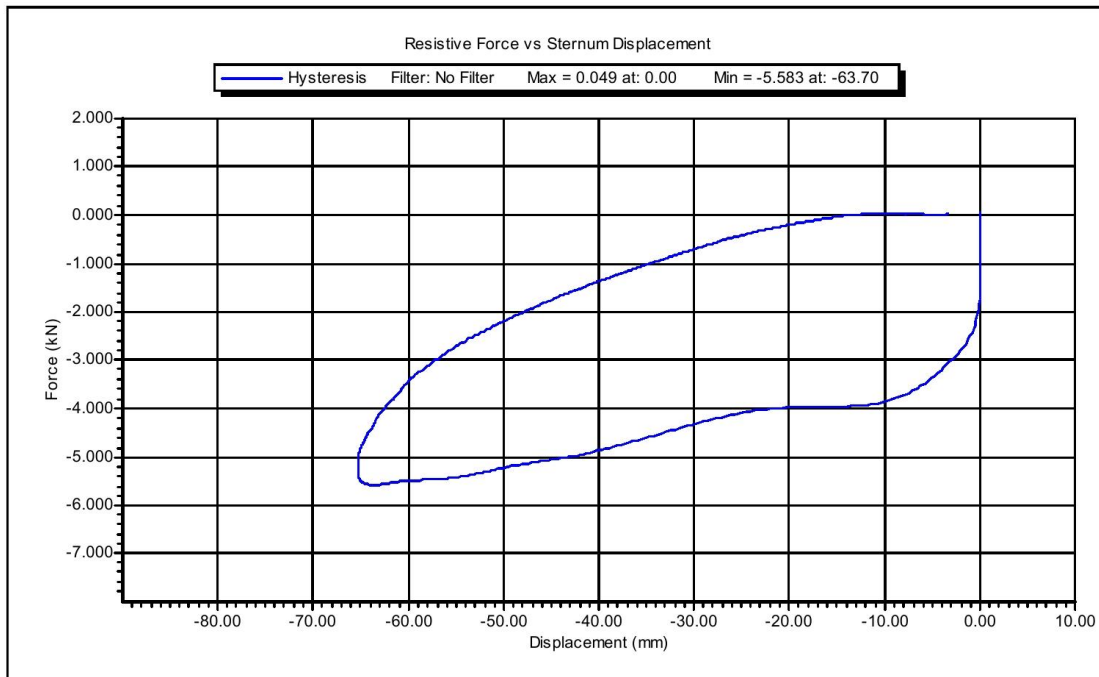


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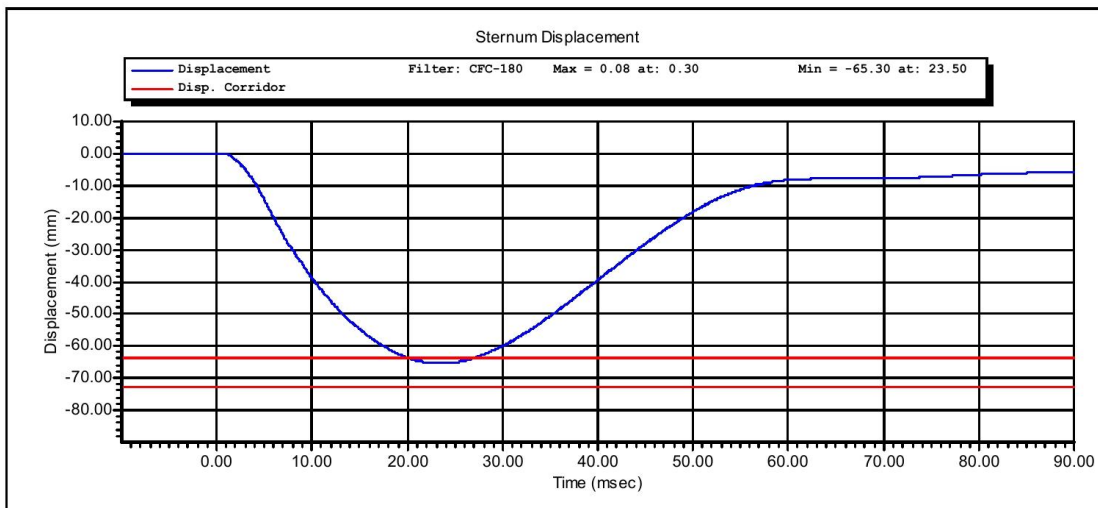
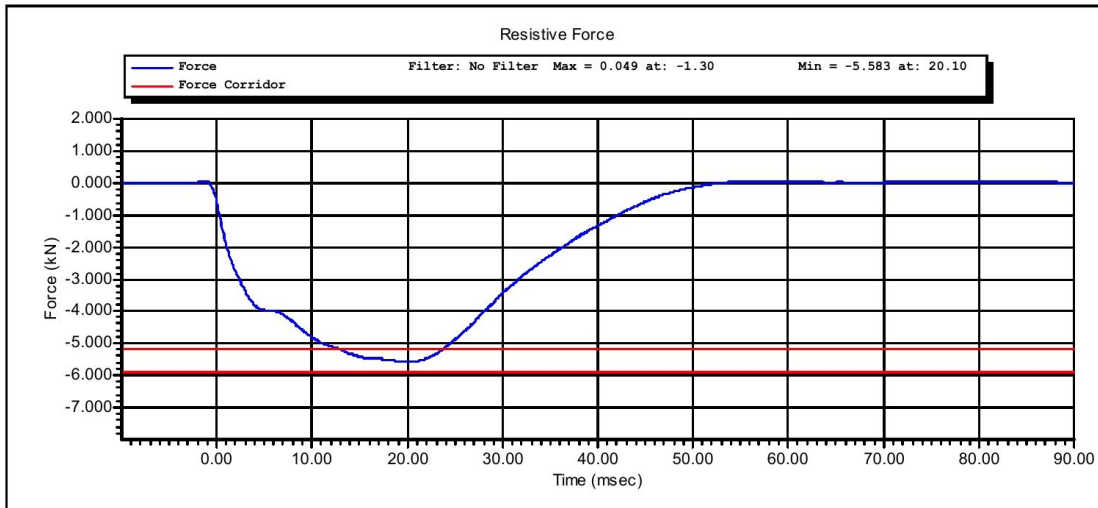
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Thorax	Test Date:	11/7/2012
Test Number:	2	Test Time:	8:42:49 AM



Test Time: 8:42:49 AM

Test Date: 11/7/2012

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Test Time: **8:42:49 AM**

Test Date: **11/7/2012**

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**VERIFICATION REPORT**

Test Name:	<b>Knee Impact PENDULUM</b>	Revision:	<b>10/1/2001</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>Hybrid III 50'th</b>		
ATD Serial Number:	<b>061</b>		
Test ID:	<b>Knee Impact Left</b>	Test Date:	<b>11/7/2012</b>
Test Number:	<b>1</b>	Test Time:	<b>9:48:52 AM</b>

Component Part Number	Component Serial Number
<b>Knee Skin - 78051(L)</b>	<b>3268</b>

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	<b>21.2</b> deg C P
Humidity	10.0 -- 70.0	<b>18.1</b> %RH P
Velocity	2.07 -- 2.13	<b>2.10</b> m/s P
Resistive Force	-5.78 -- -4.72	<b>-4.82</b> kN P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **D. Travale**

Test Time: **9:48:52 AM**

Test Date: **11/7/2012**





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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2012
Endevco	7264-2000	P66927	6/15/2012

Test Time: 9:48:52 AM

Test Date: 11/7/2012

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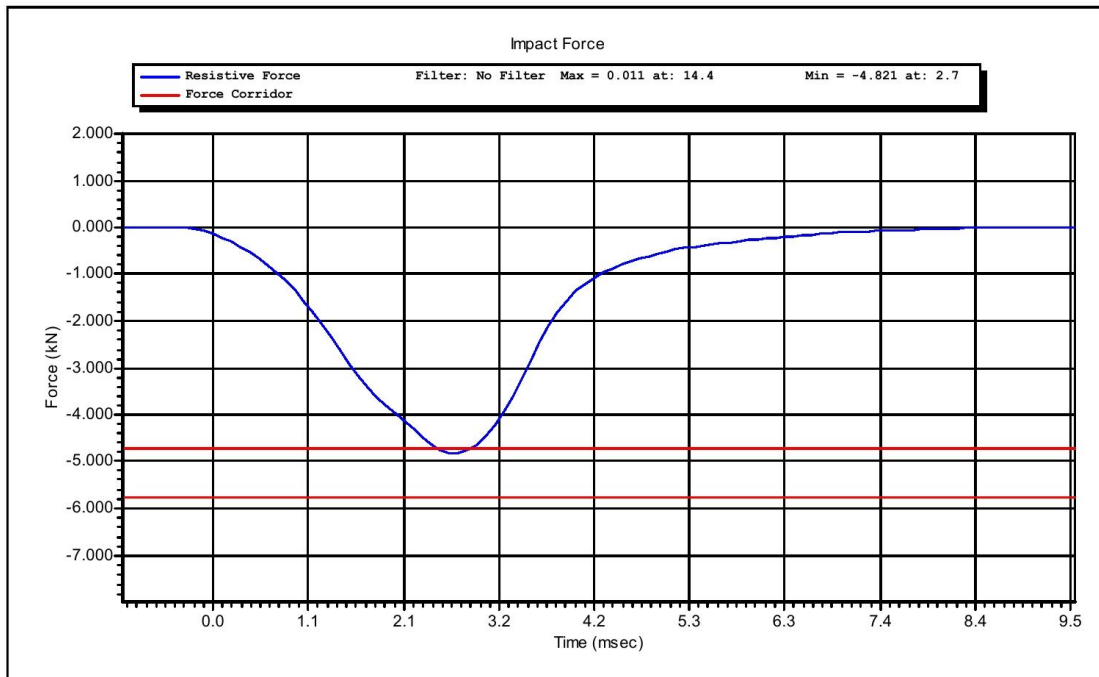


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## Calspan - Transportation Research Group

4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

Test Name:	Knee Impact PENDULUM	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Knee Impact Left	Test Date:	11/7/2012
Test Number:	1	Test Time:	9:48:52 AM



Test Time: 9:48:52 AM

Test Date: 11/7/2012

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

**VERIFICATION REPORT**

Test Name:	<b>Knee Impact PENDULUM</b>	Revision:	<b>10/1/2001</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>Hybrid III 50'th</b>		
ATD Serial Number:	<b>061</b>		
Test ID:	<b>Knee Impact Right</b>	Test Date:	<b>11/7/2012</b>
Test Number:	<b>1</b>	Test Time:	<b>10:01:26 AM</b>

Component Part Number	Component Serial Number
<b>Knee Skin - 78051(L) or 6(R)</b>	<b>3158</b>

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	<b>21.4</b> deg C P
Humidity	10.0 -- 70.0	<b>18.3</b> %RH P
Velocity	2.07 -- 2.13	<b>2.10</b> m/s P
Resistive Force	-5.78 -- -4.72	<b>-5.69</b> kN P

All test parameters are within specifications

Technician: **M. Goehle**Supervisor: **D. Travale**Test Time: **10:01:26 AM**Test Date: **11/7/2012**

**VERIFICATION REPORT**

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2012
Endevco	7264-2000	P66927	6/15/2012

Test Time: 10:01:26 AM

Test Date: 11/7/2012

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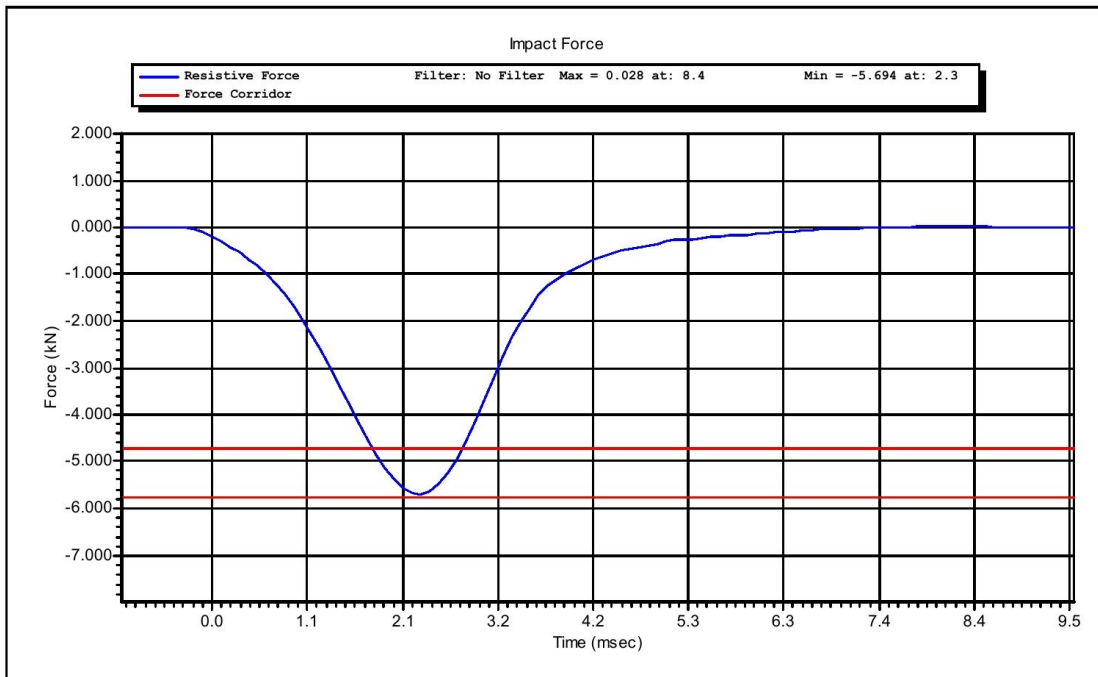


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Test Name:	Knee Impact PENDULUM	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Knee Impact Right	Test Date:	11/7/2012
Test Number:	1	Test Time:	10:01:26 AM



Test Time: 10:01:26 AM

Test Date: 11/7/2012

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### VERIFICATION REPORT

Test Name:	<b>Hip Flexion (ROM)</b>	Revision:	<b>10/1/2001</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>Hybrid III 50'th</b>		
ATD Serial Number:	<b>061</b>		
Test ID:	<b>Hip ROM Left</b>	Test Date:	<b>11/7/2012</b>
Test Number:	<b>1</b>	Test Time:	<b>11:33:05 AM</b>

Component Part Number	Component Serial Number
<b>Pelvis Assembly 78051-60</b>	<b>2398</b>

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	<b>21.9</b> deg C P
Humidity	10 -- 70	<b>23</b> %RH P
Average Velocity	5.0 -- 10.0	<b>7.0</b> deg/s P
Angle at 203 Nm	40.0 -- 50.0	<b>41.0</b> degrees P
Moment at 30 degrees	0.0 -- 94.9	<b>74.3</b> Nm P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **D. Travale**

Test Time: **11:33:05 AM**

Test Date: **11/7/2012**

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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Key	2301-02	115	12/15/2011
Transducers/PCB	14CB1-3615	0008	3/16/2012
DentonATD	Velocity Trap	1	1/11/2012
DentonATD			

Test Time: 11:33:05 AM

Test Date: 11/7/2012

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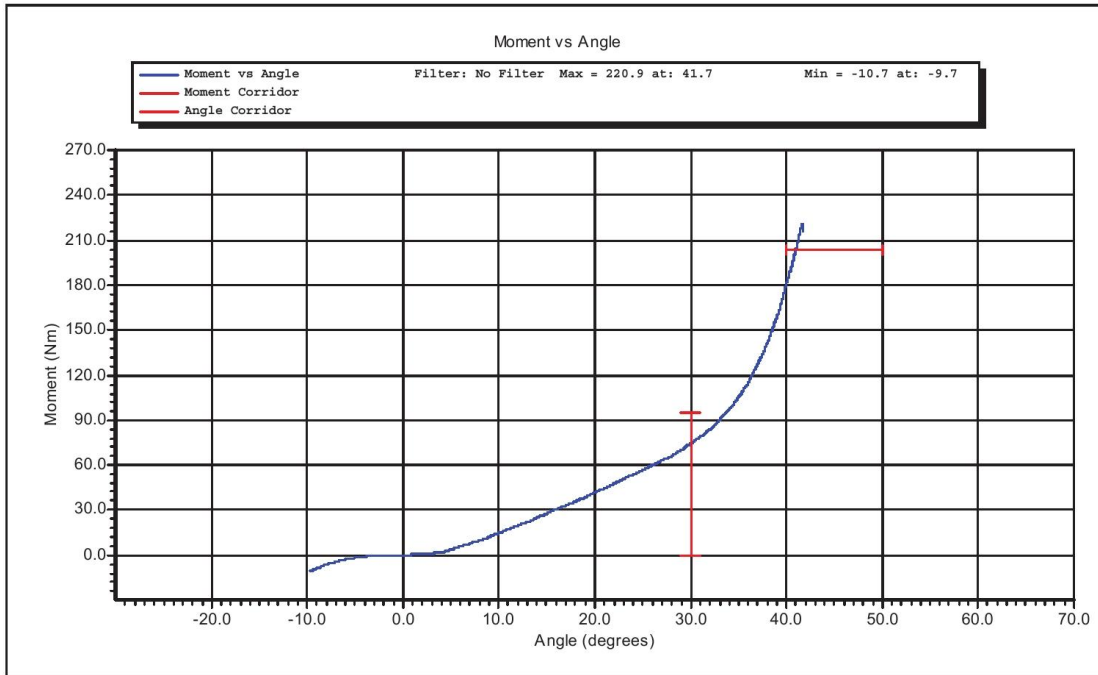


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Test Name:	Hip Flexion (ROM)	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Hip ROM Left	Test Date:	11/7/2012
Test Number:	1	Test Time:	11:33:05 AM



Test Time: 11:33:05 AM

Test Date: 11/7/2012

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### VERIFICATION REPORT

Test Name:	<b>Hip Flexion (ROM)</b>	Revision:	<b>10/1/2001</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>Hybrid III 50'th</b>		
ATD Serial Number:	<b>061</b>		
Test ID:	<b>Hip ROM Right</b>	Test Date:	<b>11/7/2012</b>
Test Number:	<b>1</b>	Test Time:	<b>12:15:13 PM</b>

Component Part Number	Component Serial Number
<b>Pelvis Assembly 78051-60</b>	<b>2398</b>

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	<b>22.0</b> deg C P
Humidity	10 -- 70	<b>24</b> %RH P
Average Velocity	5.0 -- 10.0	<b>6.2</b> deg/s P
Angle at 203 Nm	40.0 -- 50.0	<b>40.2</b> degrees P
Moment at 30 degrees	0.0 -- 94.9	<b>84.9</b> Nm P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **D. Travale**

Test Time: **12:15:13 PM**

Test Date: **11/7/2012**

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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Key	2301-02	115	12/15/2011
Transducers/PCB	14CB1-3615	0008	3/16/2012
DentonATD	Velocity Trap	1	1/11/2012
DentonATD			

Test Time: 12:15:13 PM

Test Date: 11/7/2012

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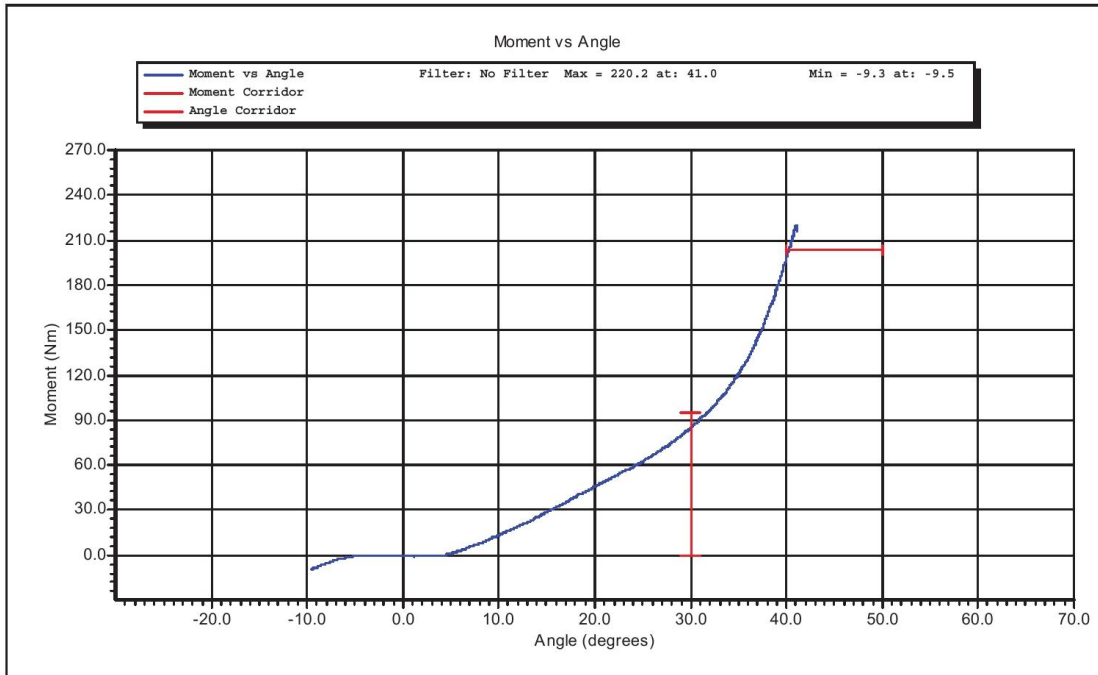


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Test Name:	Hip Flexion (ROM)	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Hip ROM Right	Test Date:	11/7/2012
Test Number:	1	Test Time:	12:15:13 PM



Test Time: 12:15:13 PM

Test Date: 11/7/2012

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## **CALIBRATION TEST RESULTS**

### **PRE-TEST**

**HYBRID III 5<sup>TH</sup> PERCENTILE FEMALE - PASSENGER ATD**

**SERIAL NO: 273**





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### External Measurements

#### 5<sup>th</sup> Female SN 273

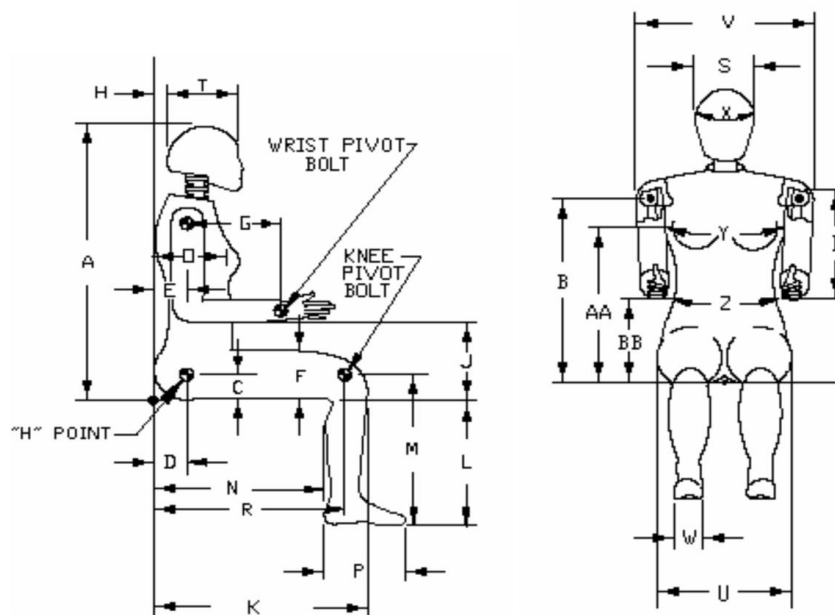
Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	774.7 – 800.1	785	Yes
B	Shoulder Pivot Height	431.8 – 457.2	452	Yes
C	H-Point Height	81.3 – 86.3	84	Yes
D	H-Point from Backline	144.8 – 149.8	147	Yes
E	Shoulder Pivot from Backline	68.6 – 83.8	76	Yes
F	Thigh Clearance	119.4 – 134.6	132	Yes
G	Back of Elbow to Wrist Pivot	243.9 – 259.1	249	Yes
H	Head Back to Backline	43.2 – 48.2	46	Yes
I	Shoulder to Elbow Length	276.8 – 297.2	286	Yes
J	Elbow Rest Height	182.8 – 203.2	194	Yes
K	Buttock to Knee Length	520.7 – 546.1	537	Yes
L	Popliteal Height	355.6 – 376	360	Yes
M	Knee Pivot Height	393.7 – 419.1	397	Yes
N	Buttock Popliteal Length	414 – 439.4	420	Yes
O	Chest Depth without Jacket	175.3 – 190.5	184	Yes
P	Foot Length (right)	218.5 – 233.7	220	Yes
R	Buttock To Knee Pivot Length	457.2 – 482.6	469	Yes
S	Head Breadth	137.1 – 147.3	143	Yes
T	Head Depth	177.8 – 188	183	Yes
U	Hip Breadth	299.7 – 314.9	310	Yes
V	Shoulder Breadth	350.5 – 365.7	357	Yes
W	Foot Breadth	78.8 – 94	82	Yes
X	Head Circumference	528.3 – 548.7	539	Yes
Y	Chest Circumference with Jacket	850.9 – 881.3	861	Yes
Z	Waist Circumference	759.5 – 789.9	770	Yes
AA	Reference Location (Chest Circumference)	332.7 – 358.1	345	Yes
BB	Reference Location (Waist Circumference)	160.1 – 170.2	165	Yes

Technician: M. Goehle

Date: 10/2/2012

# Hybrid III 5<sup>th</sup> Female External Measurements

## Reference Diagram





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### VERIFICATION REPORT

Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Head Drop	Test Date:	10/1/2012
Test Number:	1	Test Time:	3:17:02 PM

Component Part Number	Component Serial Number
Head Skin - 78051-228	780

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.7 deg C P
Humidity	10 -- 70	45 %RH P
Resultant Acceleration	250 -- 300	287 g P
Oscillation	0.0 -- 10.0	0.0 % P
Lateral Acceleration	-15.00 -- 15.00	1.56 g P

All test parameters are within specifications

Technician: M. Goehle

Supervisor: D. Travale

Test Time: 3:17:02 PM

Test Date: 10/1/2012

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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P52054	5/15/2012
Endevco	7264-2000	P52007	5/15/2012
Endevco	7264-2000	P51298	5/15/2012

Test Time: 3:17:02 PM

Test Date: 10/1/2012

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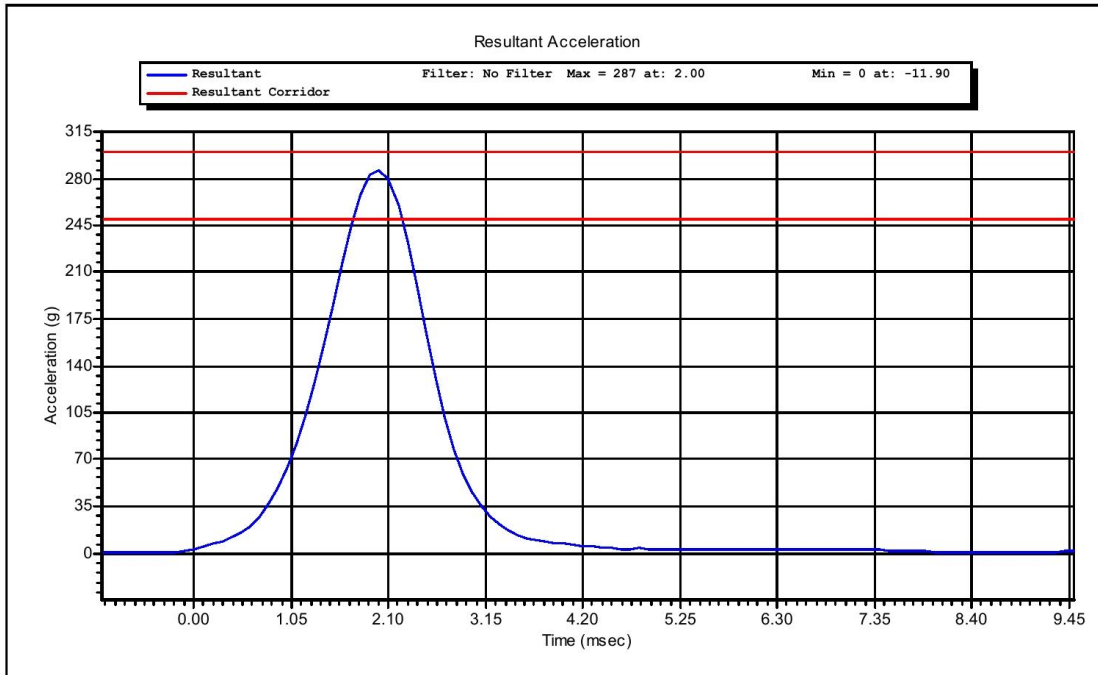


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Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Head Drop	Test Date:	10/1/2012
Test Number:	1	Test Time:	3:17:02 PM

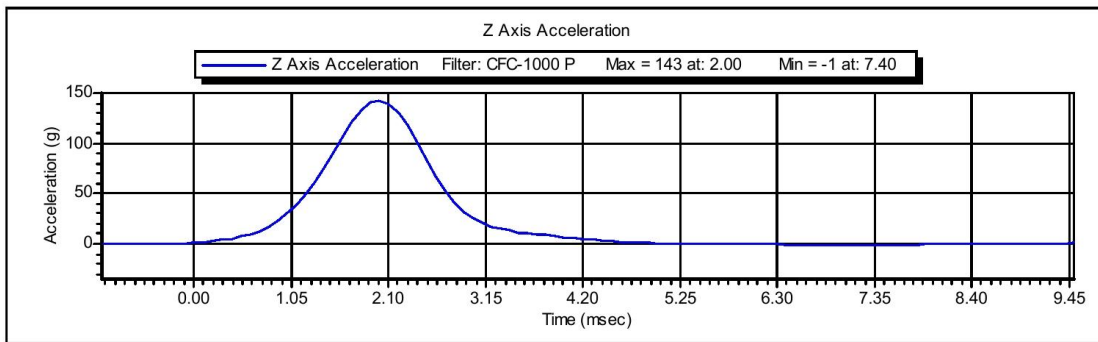
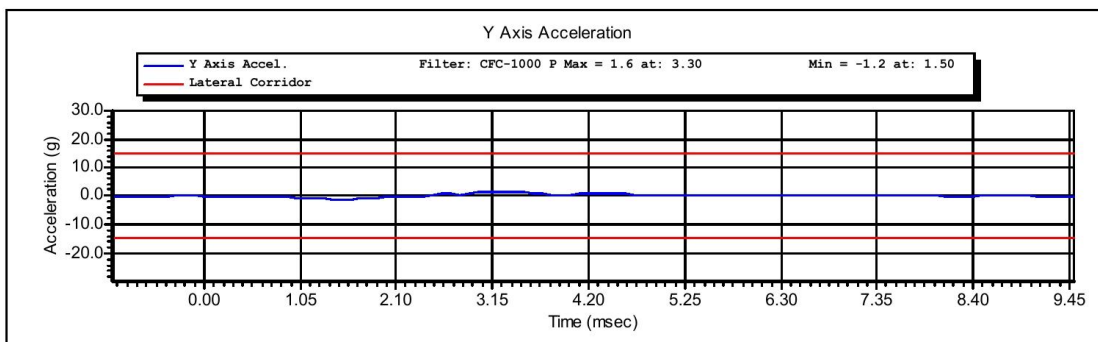
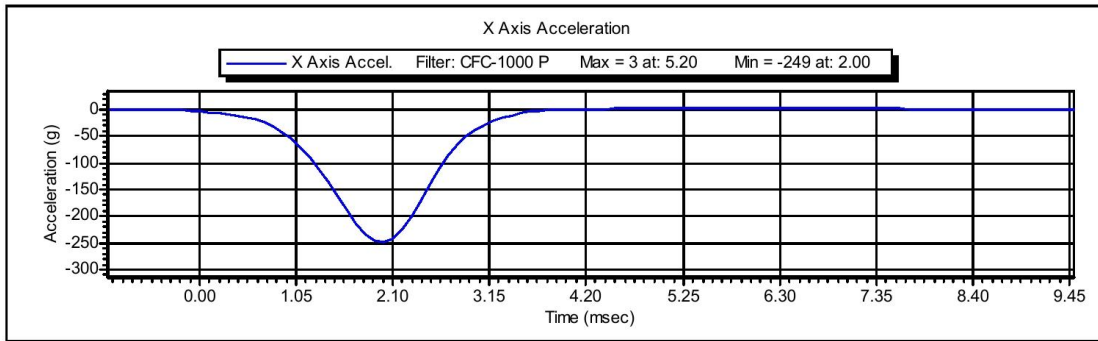


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Test Date: 10/1/2012

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Test Time: 3:17:02 PM

Test Date: 10/1/2012

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**VERIFICATION REPORT**

Test Name:	<b>Neck Flexion</b>	Revision:	<b>7/15/2002</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>Hybrid III 5'th</b>		
ATD Serial Number:	<b>272</b>		
Test ID:	<b>Neck Flexion</b>	Test Date:	<b>10/2/2012</b>
Test Number:	<b>1</b>	Test Time:	<b>8:31:16 AM</b>

Component Part Number	Component Serial Number
<b>Neck - 880105-255</b>	<b>660</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>21.8</b> deg C P
Humidity	10 -- 70	<b>49</b> %RH P
Velocity	6.89 -- 7.13	<b>7.12</b> m/s P
Pendulum Impulse at 10 ms	2.10 -- 2.50	<b>2.40</b> m/s P
Pendulum Impulse at 20 ms	4.00 -- 5.00	<b>4.76</b> m/s P
Pendulum Impulse at 30 ms	5.80 -- 7.00	<b>6.87</b> m/s P
D Plane Rotation	-91.0 -- -77.0	<b>-80.8</b> degrees P
Moment During Rotation Interval	69.0 -- 83.0	<b>69.6</b> Nm P
Moment Decay to 10.0 Nm	80.0 -- 100.0	<b>84.3</b> ms P

All test parameters are within specifications

Technician: **M. Goehle**  
 Supervisor: **D. Travale**

Test Time: **8:31:16 AM**

Test Date: **10/2/2012**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2012
Endevco	7231CT	C15016	8/15/2012
DentonATD	78051-342	PENDULUM POT	1/25/2012
DentonATD	78051-342	CONDYLE POT	1/25/2012
Denton	1716A	LC-1629 My	5/21/2012
Denton	1716A	LC-1629 Fx	5/21/2012

Test Time: 8:31:16 AM

Test Date: 10/2/2012

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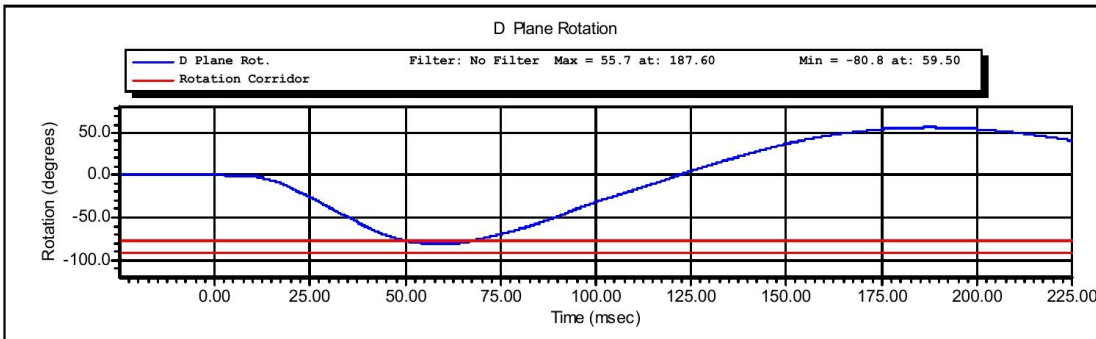
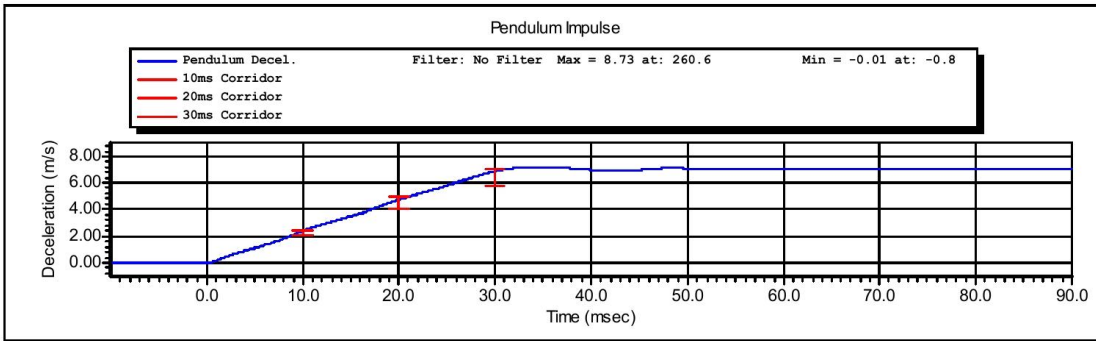


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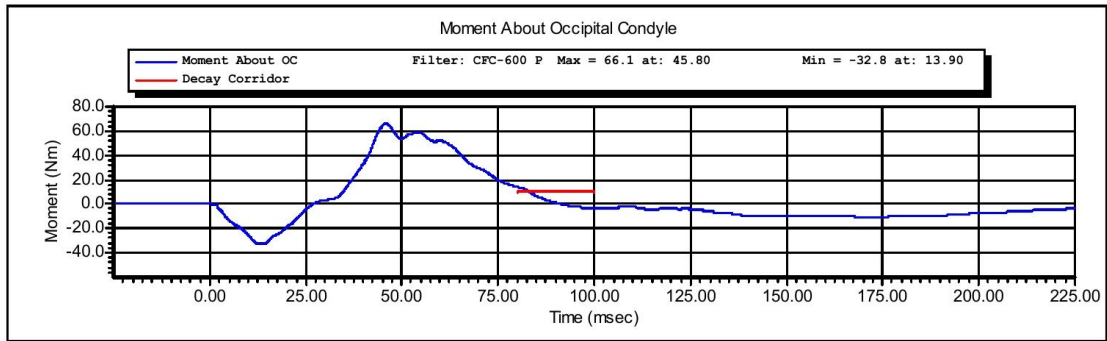
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	272		
Test ID:	Neck Flexion	Test Date:	10/2/2012
Test Number:	1	Test Time:	8:31:16 AM



Test Time: 8:31:16 AM

Test Date: 10/2/2012

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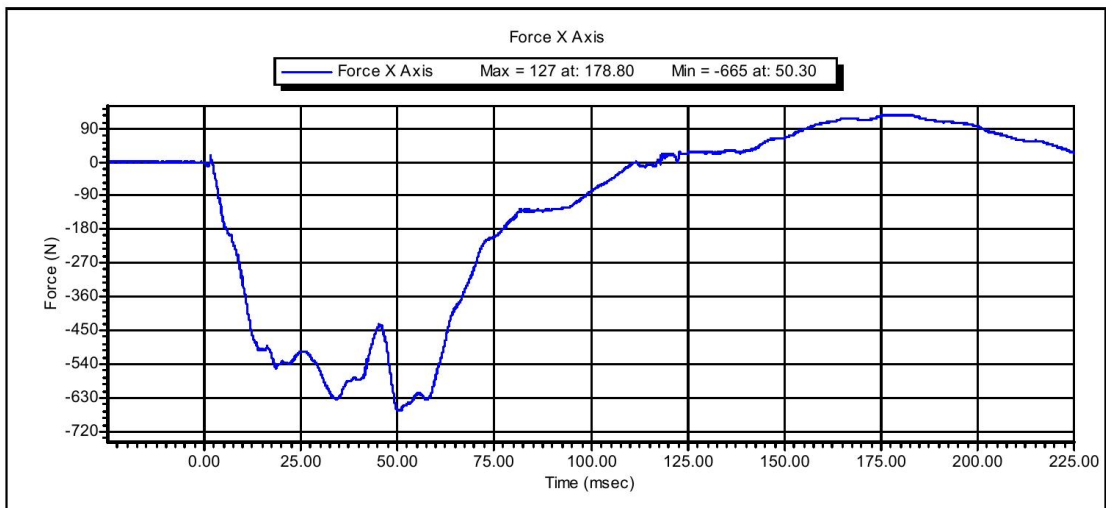
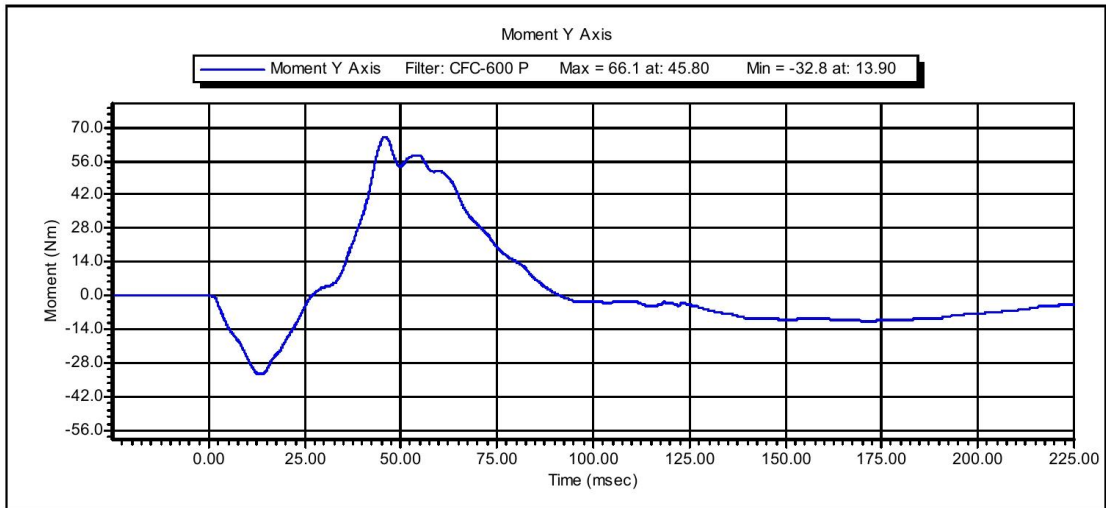


Test Time: 8:31:16 AM

Test Date: 10/2/2012

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Test Time: **8:31:16 AM**

Test Date: **10/2/2012**

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**VERIFICATION REPORT**

Test Name:	<b>Neck Extension</b>	Revision:	<b>7/15/2002</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>Hybrid III 5'th</b>		
ATD Serial Number:	<b>273</b>		
Test ID:	<b>Neck Extension</b>	Test Date:	<b>10/2/2012</b>
Test Number:	<b>2</b>	Test Time:	<b>9:25:24 AM</b>

Component Part Number	Component Serial Number
<b>Neck - 880105-255</b>	<b>660</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>21.7</b> deg C P
Humidity	10 -- 70	<b>46</b> %RH P
Velocity	5.95 -- 6.19	<b>6.14</b> m/s P
Pendulum Impulse at 10 ms	1.50 -- 1.90	<b>1.84</b> m/s P
Pendulum Impulse at 20 ms	3.10 -- 3.90	<b>3.75</b> m/s P
Pendulum Impulse at 30 ms	4.60 -- 5.60	<b>5.60</b> m/s P
D Plane Rotation	99.0 -- 114.0	<b>105.7</b> degrees P
Moment During Rotation Interval	-65.0 -- -53.0	<b>-58.4</b> Nm P
Moment Decay to -10.0 Nm	94.0 -- 114.0	<b>99.8</b> ms P

All test parameters are within specifications

Technician: **M. Goehle**  
 Supervisor: **D. Travale**

Test Time: **9:25:24 AM**

Test Date: **10/2/2012**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2012
Endevco	7231CT	C15016	8/15/2012
DentonATD	78051-342	PENDULUM POT	1/25/2012
DentonATD	78051-342	CONDYLE POT	1/25/2012
Denton	1716A	LC-1629 My	5/21/2012
Denton	1716A	LC-1629 Fx	5/21/2012

Test Time: 9:25:24 AM

Test Date: 10/2/2012

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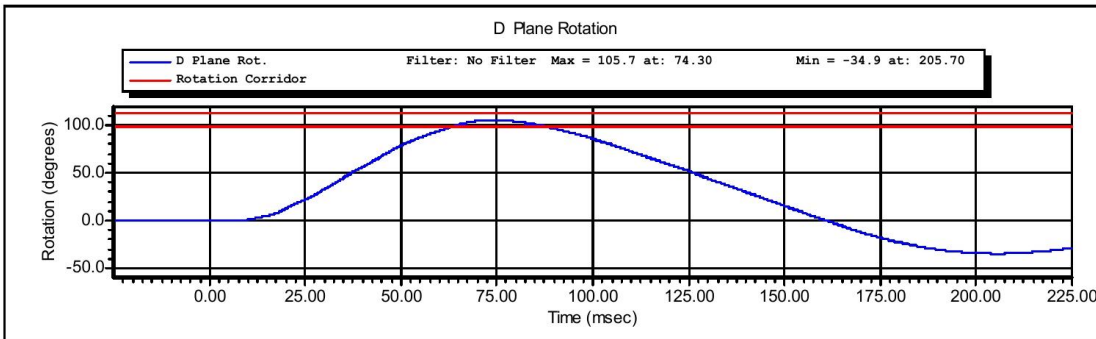
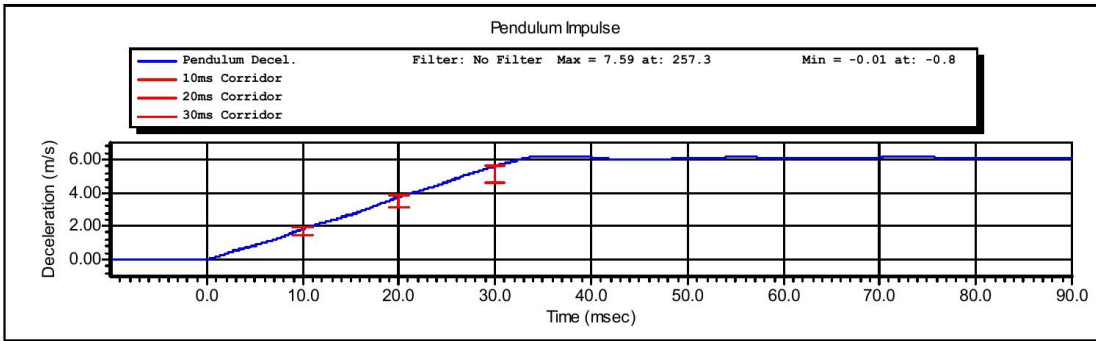


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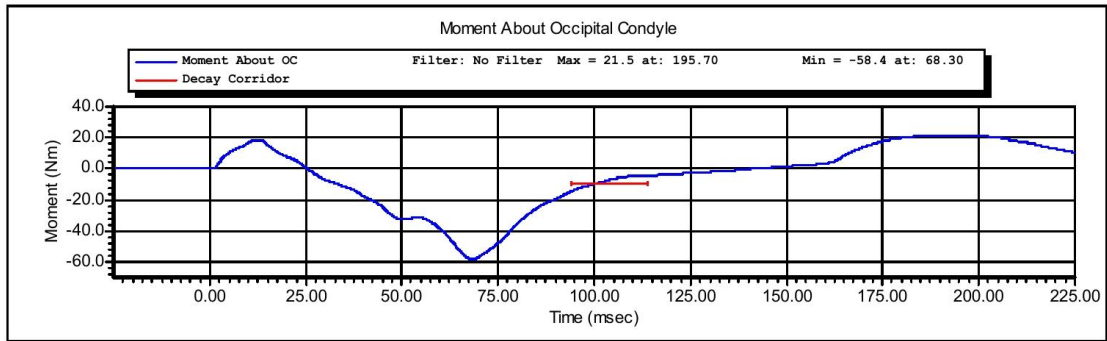
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Extension	Test Date:	10/2/2012
Test Number:	2	Test Time:	9:25:24 AM



Test Time: 9:25:24 AM

Test Date: 10/2/2012

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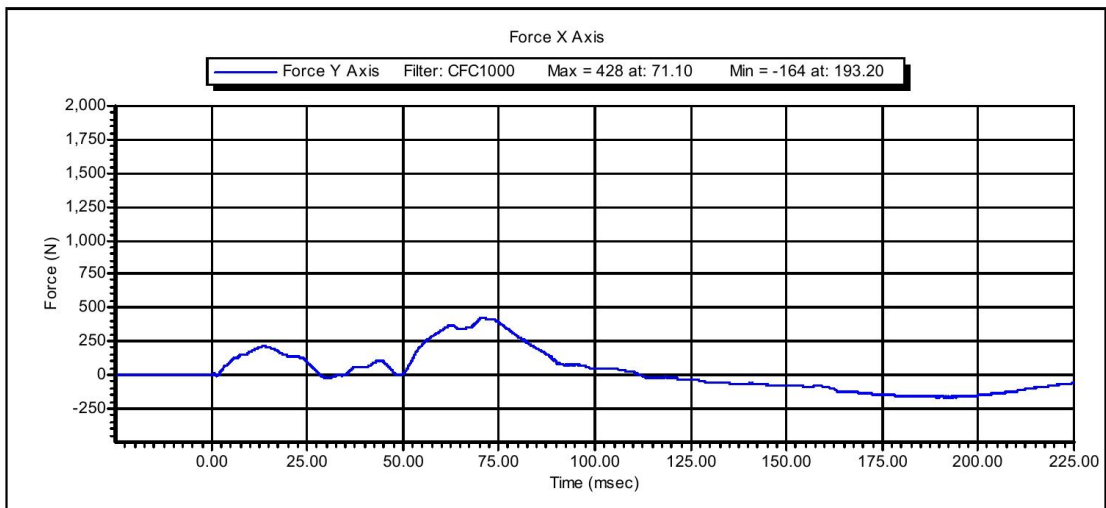
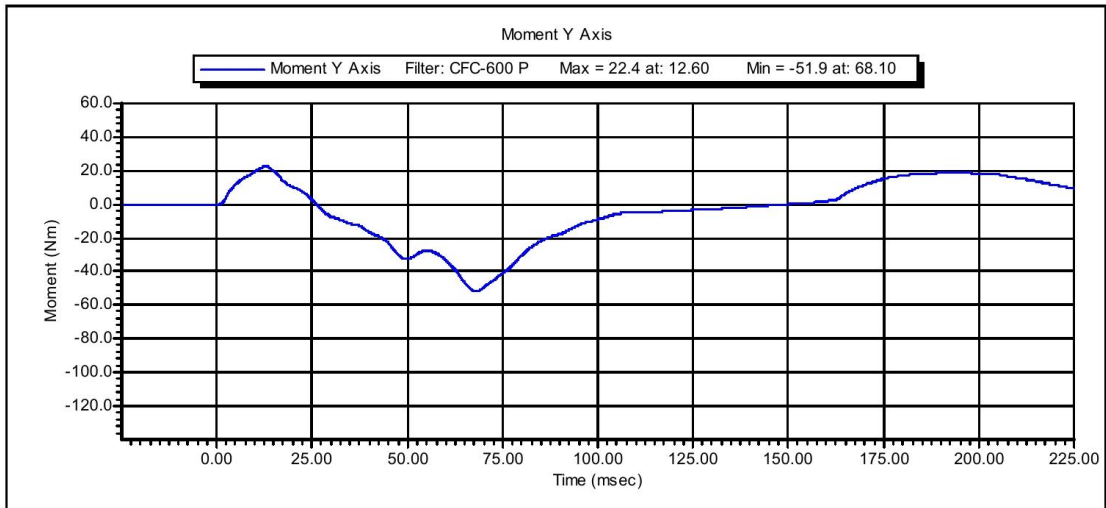


Test Time: 9:25:24 AM

Test Date: 10/2/2012

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Test Time: **9:25:24 AM**

Test Date: **10/2/2012**

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### VERIFICATION REPORT

Test Name:	<b>Thorax Impact</b>	Revision:	<b>7/15/2002</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>Hybrid III 5'th</b>		
ATD Serial Number:	<b>273</b>		
Test ID:	<b>Thorax Impact</b>	Test Date:	<b>10/1/2012</b>
Test Number:	<b>1</b>	Test Time:	<b>9:28:15 AM</b>

Component Part Number	Component Serial Number
<b>Ribs 880105-RS</b>	<b>670</b>
<b>Chest Jacket - 880105-355-E</b>	<b>DH0069</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>21.6</b> deg C P
Humidity	10.0 -- 70.0	<b>41.9</b> %RH P
Velocity	6.59 -- 6.83	<b>6.63</b> m/s P
Sternum Displacement	-58.0 -- -50.0	<b>-53.7</b> mm P
Force During Displacement Interval	-4400 -- -3900	<b>-4115</b> N P
Force -18.0 to -50.0 Displacement	-4600 -- 0	<b>-4086</b> N P
Hysteresis	69 -- 85	<b>71</b> % P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **D. Travale**

Test Time: **9:28:15 AM**

Test Date: **10/1/2012**

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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2012
Endevco	7231CT	C14953	5/25/2012
DentonATD	78051-342	DS-273	5/18/2012

Test Time: 9:28:15 AM

Test Date: 10/1/2012

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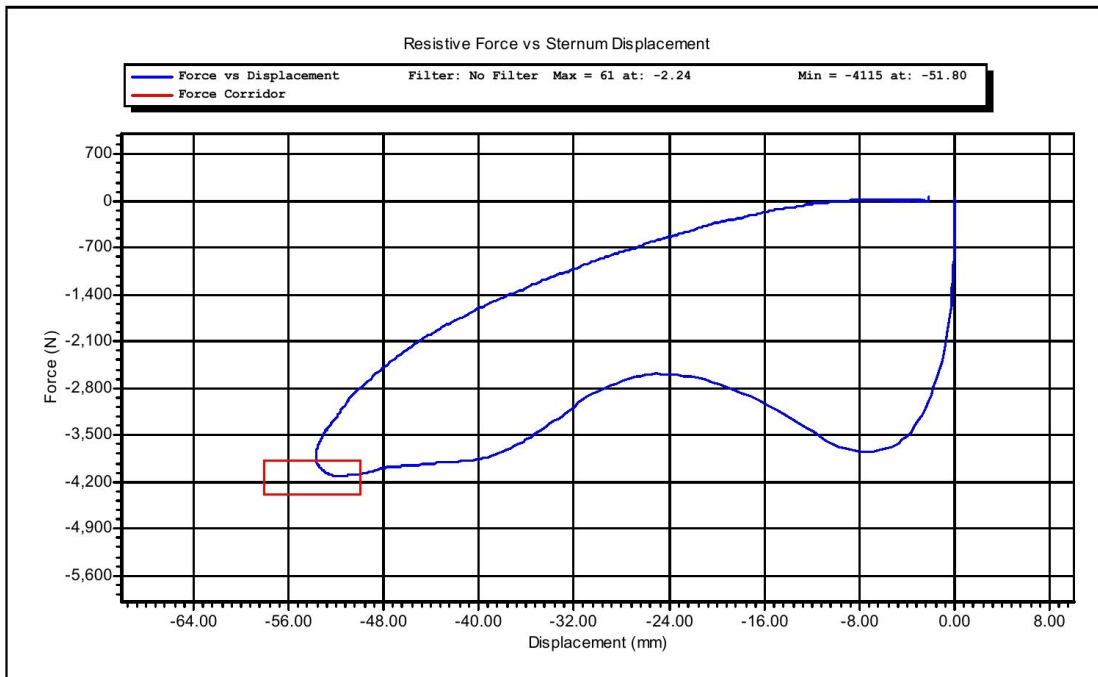


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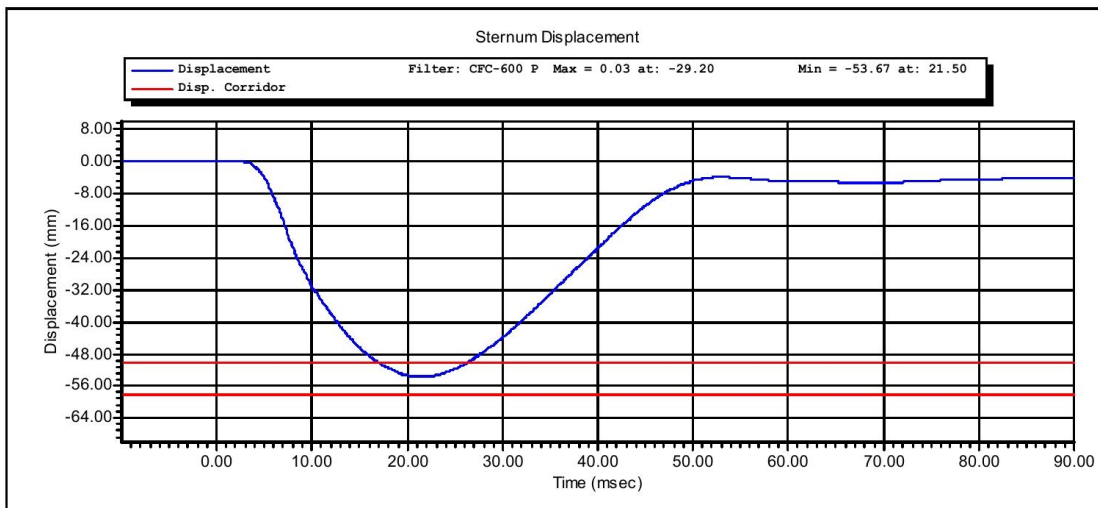
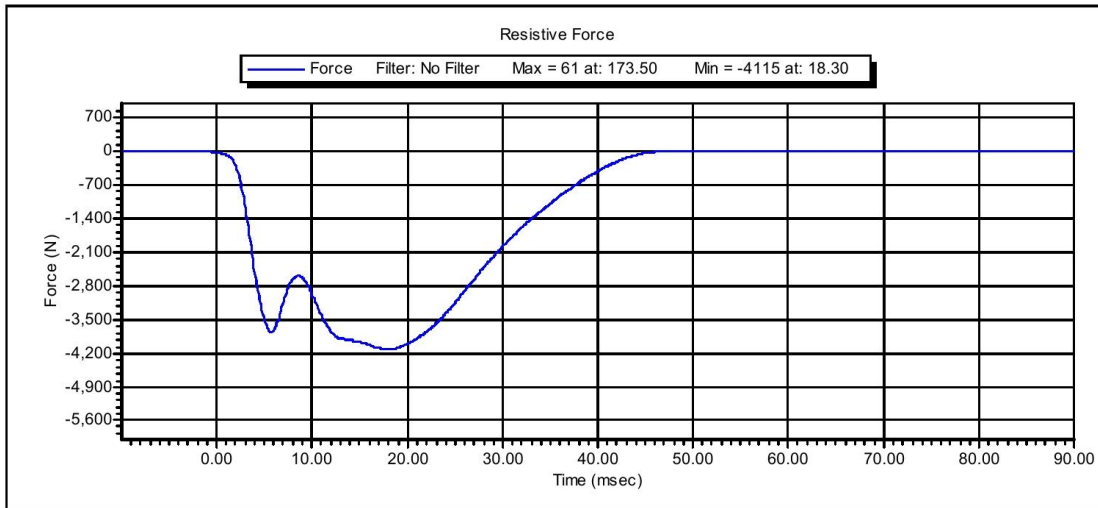
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Thorax Impact	Test Date:	10/1/2012
Test Number:	1	Test Time:	9:28:15 AM



Test Time: 9:28:15 AM

Test Date: 10/1/2012

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Test Time: 9:28:15 AM

Test Date: 10/1/2012

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**VERIFICATION REPORT**

Test Name:	<b>Knee Impact PENDULUM</b>	Revision:	<b>7/15/2002</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>Hybrid III 5'th</b>		
ATD Serial Number:	<b>273</b>		
Test ID:	<b>Knee Impact Left</b>	Test Date:	<b>10/1/2012</b>
Test Number:	<b>1</b>	Test Time:	<b>12:05:36 PM</b>

Component Part Number	Component Serial Number
<b>Knee Skin - 880105-508</b>	<b>1726</b>
<b>Knee Insert - 880105-511</b>	<b>1039</b>

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	<b>22.2</b> deg C P
Humidity	10.0 -- 70.0	<b>36.4</b> %RH P
Velocity	2.07 -- 2.13	<b>2.09</b> m/s P
Resistive Force	-4060 -- -3450	<b>-3895</b> N P

All test parameters are within specifications

Technician: **M. Goehle**  
 Supervisor: **D. Travale**

Test Time: **12:05:36 PM**

Test Date: **10/1/2012**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2012
Endevco	7264-2000	P66927	6/15/2012

Test Time: 12:05:36 PM

Test Date: 10/1/2012

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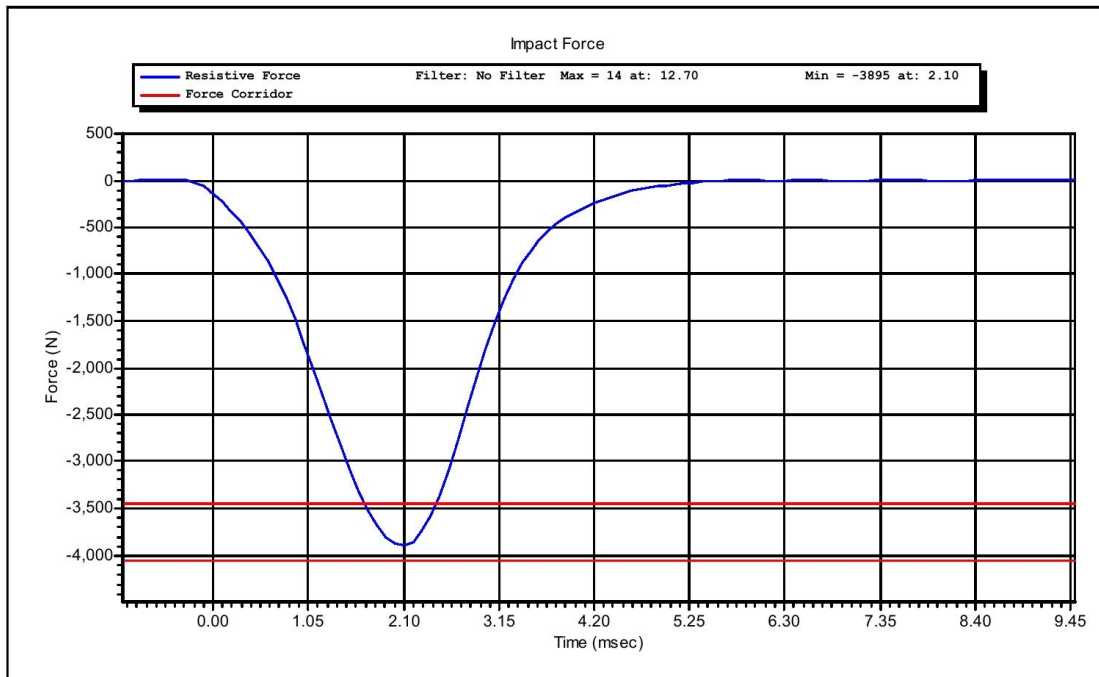


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Test Name:	Knee Impact PENDULUM	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Knee Impact Left	Test Date:	10/1/2012
Test Number:	1	Test Time:	12:05:36 PM



Test Time: 12:05:36 PM

Test Date: 10/1/2012

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### VERIFICATION REPORT

Test Name:	<b>Knee Impact PENDULUM</b>	Revision:	<b>7/15/2002</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>Hybrid III 5'th</b>		
ATD Serial Number:	<b>273</b>		
Test ID:	<b>Knee Impact Right</b>	Test Date:	<b>10/1/2012</b>
Test Number:	<b>1</b>	Test Time:	<b>12:09:35 PM</b>

Component Part Number	Component Serial Number
<b>Knee Skin - 880105-508</b>	<b>1051</b>
<b>Knee Insert - 880105-511</b>	<b>1038</b>

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	<b>22.2</b> deg C P
Humidity	10.0 -- 70.0	<b>36.4</b> %RH P
Velocity	2.07 -- 2.13	<b>2.09</b> m/s P
Resistive Force	-4060 -- -3450	<b>-3944</b> N P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **D. Travale**

Test Time: **12:09:35 PM**

Test Date: **10/1/2012**

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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2012
Endevco	7264-2000	P66927	6/15/2012

Test Time: 12:09:35 PM

Test Date: 10/1/2012

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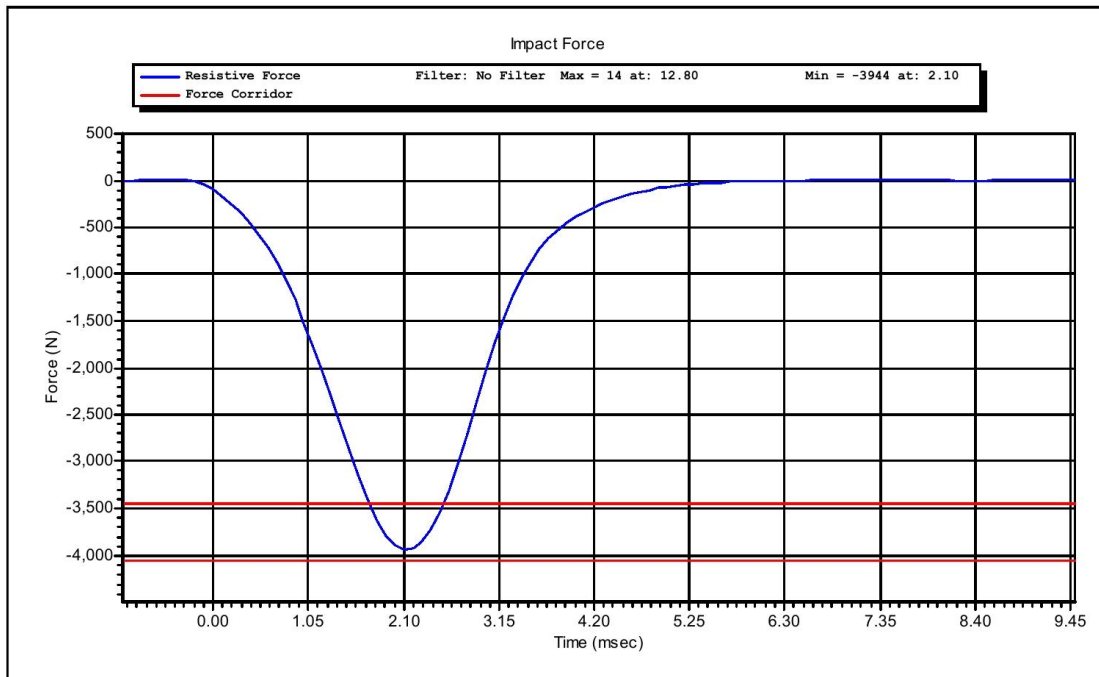


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Test Name:	Knee Impact PENDULUM	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Knee Impact Right	Test Date:	10/1/2012
Test Number:	1	Test Time:	12:09:35 PM



Test Time: 12:09:35 PM

Test Date: 10/1/2012

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## Torso Flexion

### Pre-Test

#### Part 5720 HIII 5% Female

ATD Serial No: 273

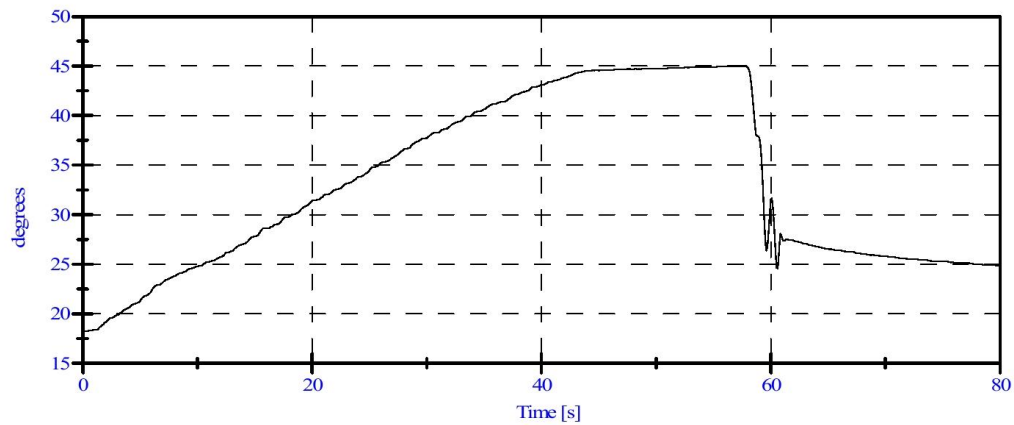
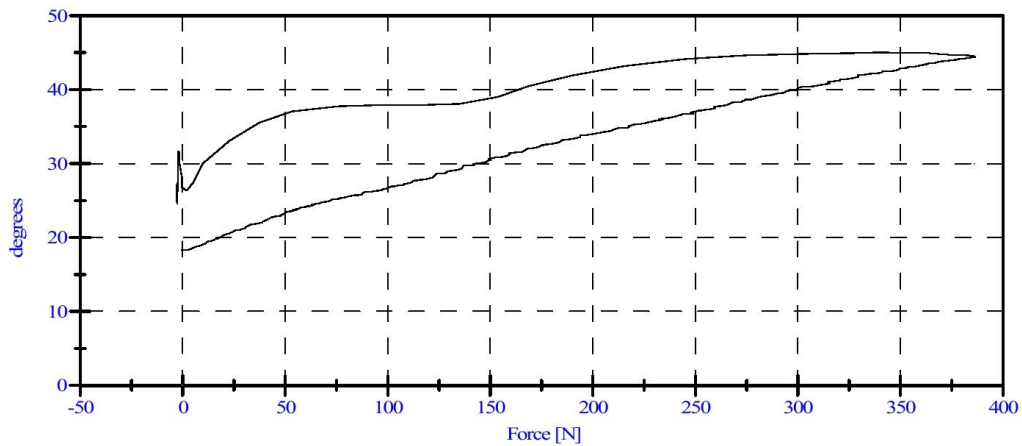
Laboratory Supervisor D. Travale

Date: 10/2/2012

Laboratory Technician: M. Goehle

TEST PARAMETER	SPECIFICATION	TEST RESULTS	STATUS
Lab Temperature:	18.9-25.6 C	22.0 C	Passed
Lab Humidity:	10-70 %	48.00 %	Passed
Initial Angle:	0.00-20.00 deg	18.27 deg	Passed
Force at 45 Deg	320.00-390.00 N	386.07 N	Passed
Return Angle	8 Deg Max from Initial	23.58 deg	Passed

## LUMBAR SPINE FLEXION TEST



**CALIBRATION TEST RESULTS**

**POST-TEST**

**HYBRID III 50<sup>TH</sup> PERCENTILE MALE - DRIVER ATD**

**SERIAL NO: 061**

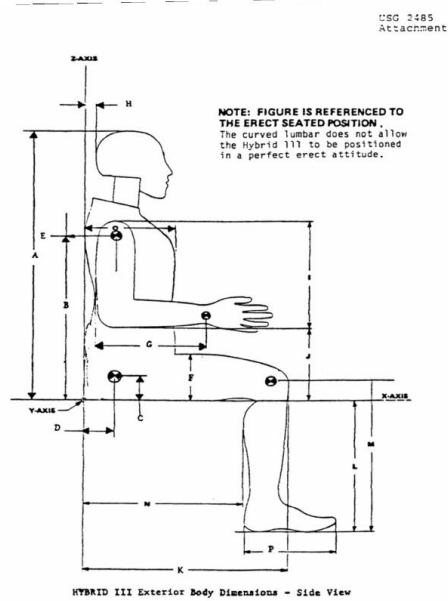
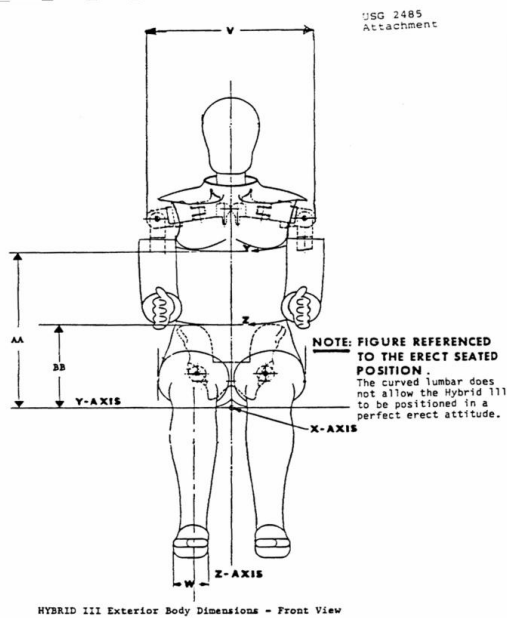
## 50<sup>th</sup> Male External Measurements

SN 061

Symbol	Description	Specification	Results	Pass
		in	in	
A	Sitting Height	34.6 - 35	34.9	Yes
B	Shoulder Pivot Height	19.9 - 20.5	20.1	Yes
C	H-Point Height	3.3 - 3.5	3.3	Yes
D	H-Point from Backline	5.3 - 5.5	5.4	Yes
E	Shoulder Pivot from Backline	3.3 - 3.7	3.5	Yes
F	Thigh Clearance	5.5 - 6.1	5.9	Yes
G	Back of Elbow to Wrist Pivot	11.4 - 12.0	11.6	Yes
H	Head Back to Backline	1.6 - 1.8	1.7	Yes
I	Shoulder to Elbow Length	13.0 - 13.6	13.3	Yes
J	Elbow Rest Height	7.5 - 8.3	8.0	Yes
K	Buttock to Knee Length	22.8 - 23.8	23.6	Yes
L	Popliteal Height	16.9 - 17.9	16.9	Yes
M	Knee Pivot Height	19.1 - 19.7	19.3	Yes
N	Buttock Popliteal Length	17.8 - 18.8	18.6	Yes
O	Chest Depth without Jacket	8.4 - 9.0	8.7	Yes
P	Foot Length (right)	9.9 - 10.5	10.2	Yes
V	Shoulder Breadth	16.3 - 17.2	16.7	Yes
W	Foot Breadth	3.6 - 4.2	4.0	Yes
Y	Chest Circumference with Jacket	38.2 - 39.4	38.9	Yes
Z	Waist Circumference	32.9 - 34.1	33.7	Yes
AA	Reference Location (Chest Circumference)	16.9 - 17.1	16.9	Yes
BB	Reference Location (Waist Circumference)	8.9 - 9.1	9.0	Yes

Technician: M. Goehle

Date: 2/5/2013







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### VERIFICATION REPORT

Test Name:	Head Drop	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:		Test Date:	2/4/2013
Test Number:	1	Test Time:	9:56:57 AM

Component Part Number	Component Serial Number
Head Skin - 78051-228	02-20544

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.7 deg C P
Humidity	10 -- 70	16 %RH P
Resultant Acceleration	225 -- 275	244 g P
Oscillation	0.0 -- 10.0	0.0 % P
Lateral Acceleration	-15.00 -- 15.00	-1.77 g P

All test parameters are within specifications

Technician: A. Rudniski

Supervisor: E. Dutton

Test Time: 9:56:57 AM

Test Date: 2/4/2013

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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P58904	1/25/2013
Endevco	7264-2000	P58911	1/26/2013
Endevco	7264-2000	P58757	1/26/2013

Test Time: 9:56:57 AM

Test Date: 2/4/2013

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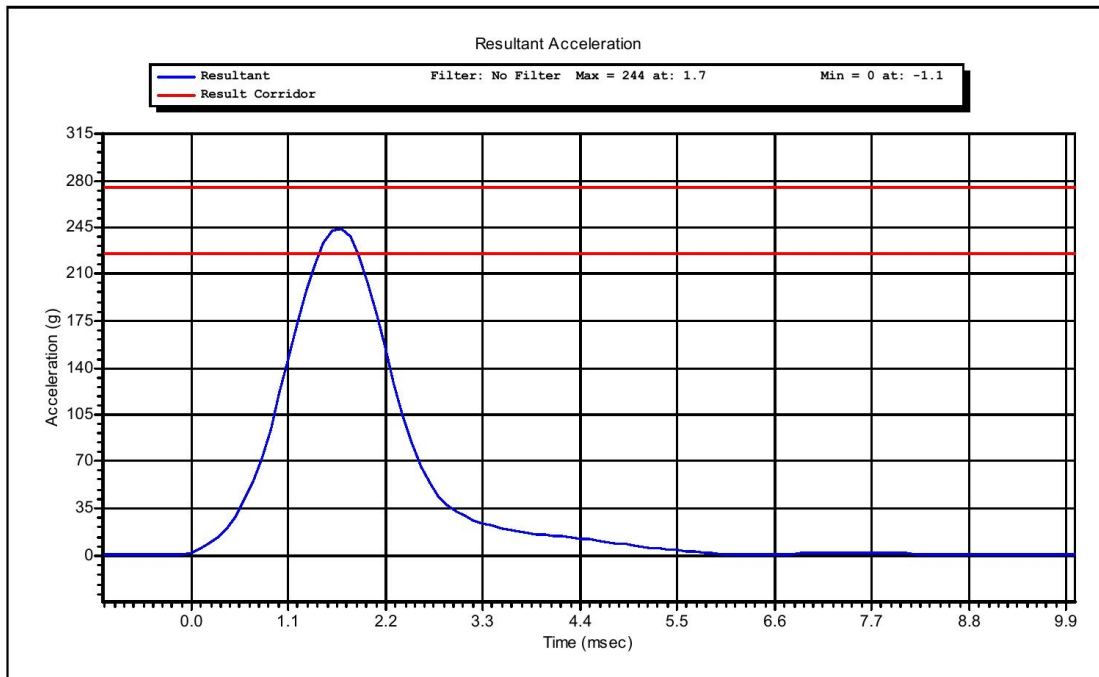


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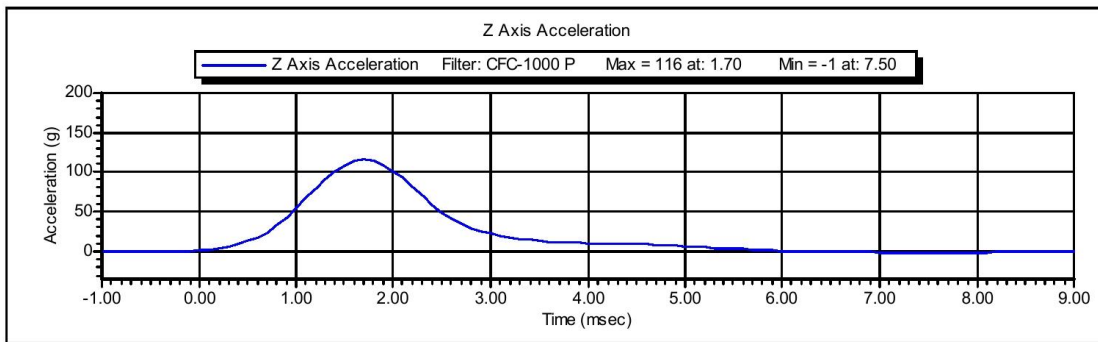
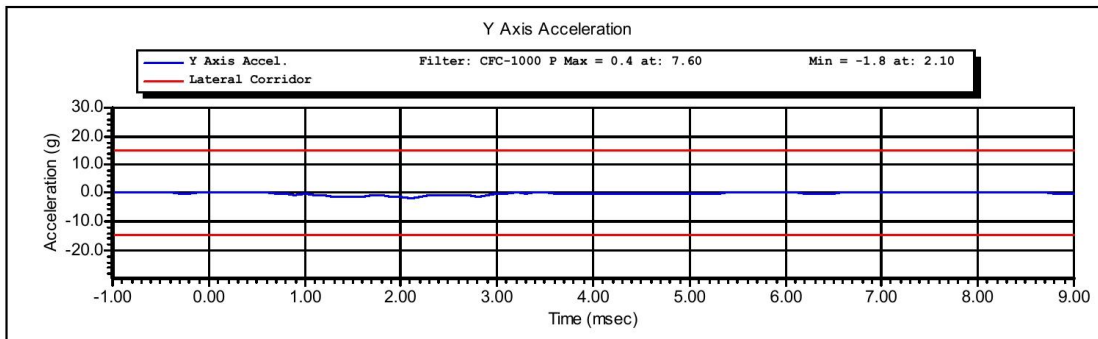
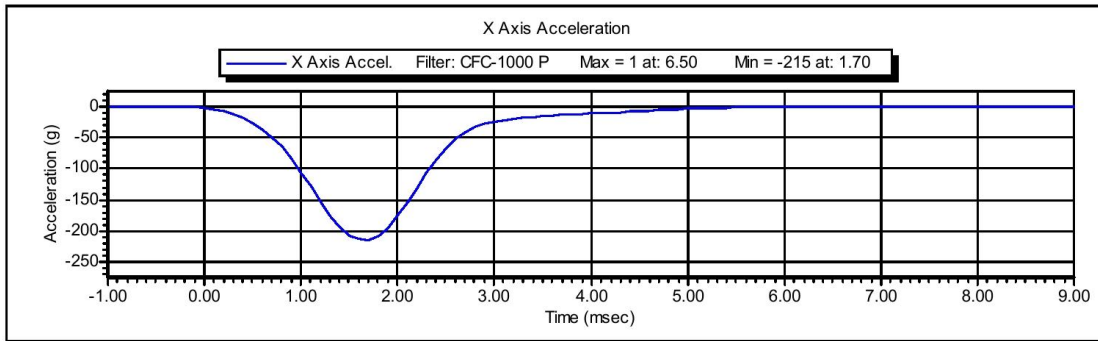
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:		Test Date:	2/4/2013
Test Number:	1	Test Time:	9:56:57 AM



Test Time: 9:56:57 AM

Test Date: 2/4/2013

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Test Time: 9:56:57 AM

Test Date: 2/4/2013

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### VERIFICATION REPORT

Test Name:	<b>Neck Flexion</b>	Revision:	<b>10/1/2001</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>Hybrid III 50'th</b>		
ATD Serial Number:	<b>061</b>		
Test ID:		Test Date:	<b>2/4/2013</b>
Test Number:	<b>2</b>	Test Time:	<b>1:11:15 PM</b>

Component Part Number	Component Serial Number
<b>Neck - 78051-336</b>	<b>4194</b>

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	<b>21.8</b> deg C	P
Humidity		10	-- 70	<b>16</b> %RH	P
Velocity		6.89	-- 7.13	<b>7.10</b> m/s	P
Pendulum Deceleration at	10 ms	22.5	-- 27.5	<b>23.7</b> g	P
Pendulum Deceleration at	20 ms	17.6	-- 22.6	<b>21.6</b> g	P
Pendulum Deceleration at	30 ms	12.5	-- 18.5	<b>17.0</b> g	P
Max Pendulum Deceleration After	30 ms	0.0	-- 29.0	<b>17.0</b> g	P
Deceleration time to	5 g	34.0	-- 42.0	<b>37.3</b> ms	P
D Plane Rotation		-78.0	-- -64.0	<b>-65.8</b> degrees	P
Time at max rotation		57.0	-- 64.0	<b>59.4</b> ms	P
Rotation Decay to Zero		113.0	-- 128.0	<b>120.4</b> ms	P
Moment about OC		88.1	-- 108.4	<b>95.3</b> Nm	P
Time at Max Moment		47.0	-- 58.0	<b>47.9</b> ms	P
Moment Decay to Zero		97.0	-- 107.0	<b>99.9</b> ms	P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **E. Dutton**

Test Time: **1:11:15 PM**

Test Date: **2/4/2013**

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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	C15016	8/15/2012
DentonATD	78051-342	PENDULUM POT	1/25/2013
DentonATD	78051-342	CONDYLE POT	1/25/2013
Denton	IF-205	LC-175 My	5/21/2012
Denton	IF-205	LC-175 Fx	5/21/2012

Test Time: 1:11:15 PM

Test Date: 2/4/2013

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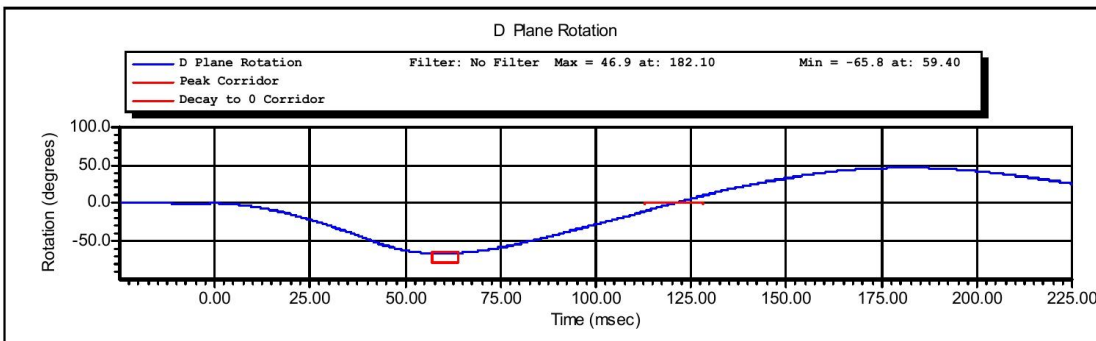
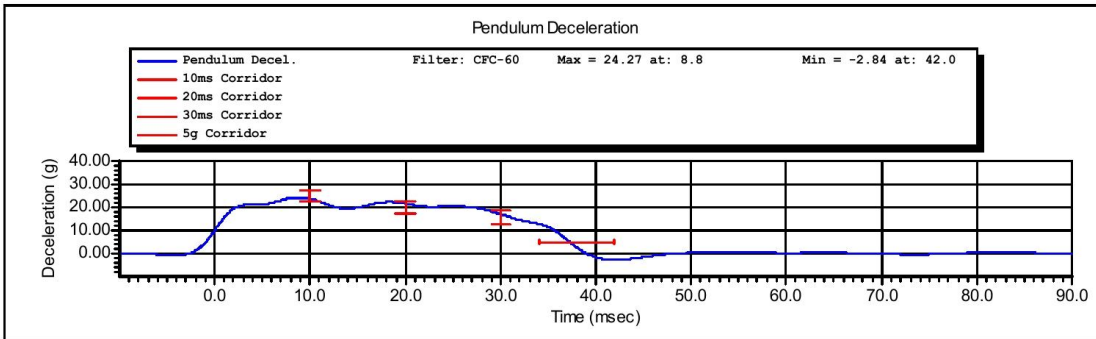


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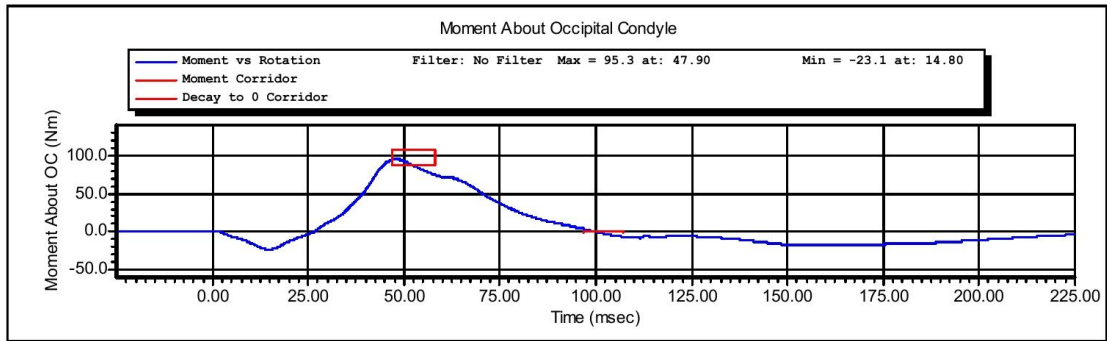
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Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:	061		
ID of Test:		Date:	2/4/2013
Number of Test:	2	Time of Test:	1:11:15 PM



Time of Test: 1:11:15 PM

Date of Test: 2/4/2013

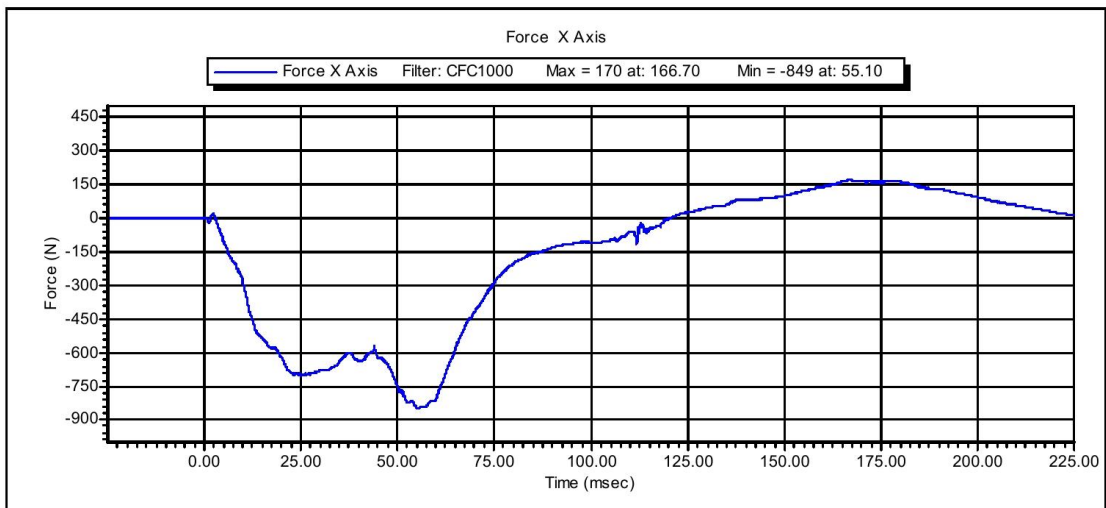
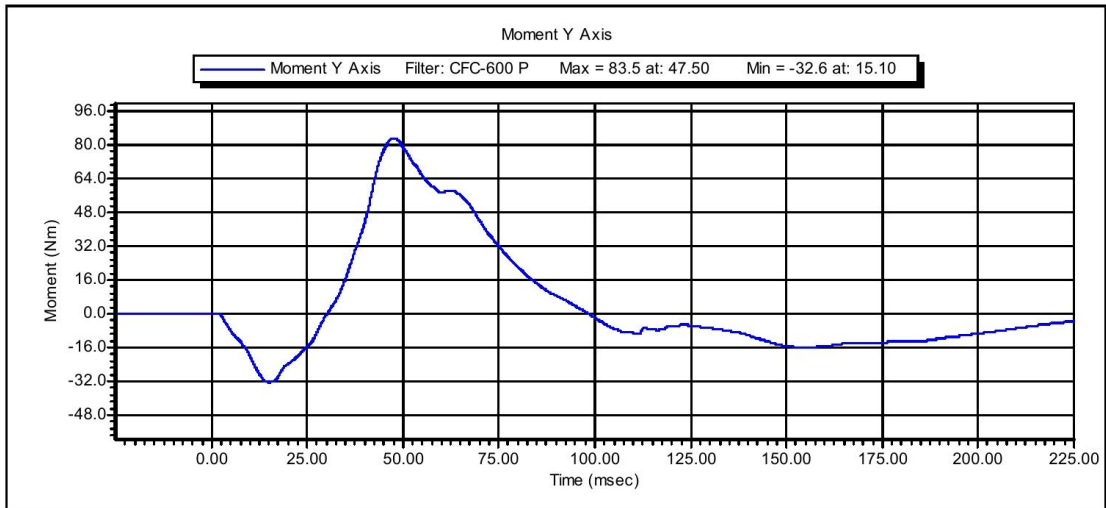
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Time of Test: 1:11:15 PM

Date of Test: 2/4/2013

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Time of Test: 1:11:15 PM

Date of Test: 2/4/2013

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### VERIFICATION REPORT

Test Name:	<b>Neck Extension</b>	Revision:	<b>10/1/2001</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>Hybrid III 50'th</b>		
ATD Serial Number:	<b>061</b>		
Test ID:		Test Date:	<b>2/4/2013</b>
Test Number:	<b>1</b>	Test Time:	<b>1:44:23 PM</b>

Component Part Number	Component Serial Number
<b>Neck - 78051-336</b>	<b>4194</b>

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	<b>21.8</b> deg C	P
Humidity		10	-- 70	<b>16</b> %RH	P
Velocity		5.94	-- 6.19	<b>6.12</b> m/s	P
Pendulum Deceleration at	10 ms	17.2	-- 21.2	<b>18.4</b> g	P
Pendulum Deceleration at	20 ms	14.0	-- 19.0	<b>17.7</b> g	P
Pendulum Deceleration at	30 ms	11.0	-- 16.0	<b>13.4</b> g	P
Max Pendulum Deceleration after	30 ms	0.0	-- 22.0	<b>13.8</b> g	P
Decel Time to	5 g	38.0	-- 46.0	<b>39.6</b> ms	P
D Plane Rotation		81.0	-- 106.0	<b>93.9</b> degrees	P
Time at Max Rotation		72.0	-- 82.0	<b>76.3</b> ms	P
Rotation Decay to Zero		147.0	-- 174.0	<b>158.0</b> ms	P
Moment About Occipital Condyle		-80.0	-- -52.9	<b>-68.7</b> Nm	P
Time at Max Moment		65.0	-- 79.0	<b>71.4</b> ms	P
Moment Decay to Zero		120.0	-- 148.0	<b>137.9</b> ms	P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **E.dutton**

Test Time: **1:44:23 PM**

Test Date: **2/4/2013**

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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	C15016	8/15/2012
DentonATD	78051-342	PENDULUM POT	1/25/2013
DentonATD	78051-342	CONDYLE POT	1/25/2013
Denton	IF-205	LC-175 My	5/21/2012
Denton	IF-205	LC-175 Fx	5/21/2012

Test Time: 1:44:23 PM

Test Date: 2/4/2013

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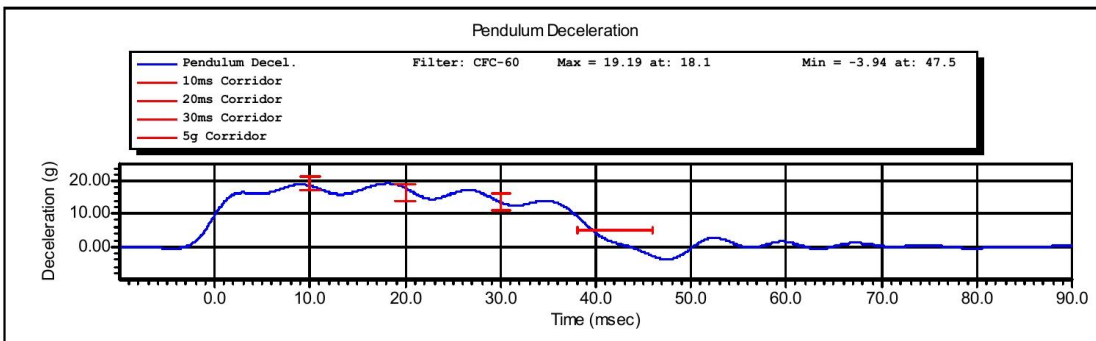
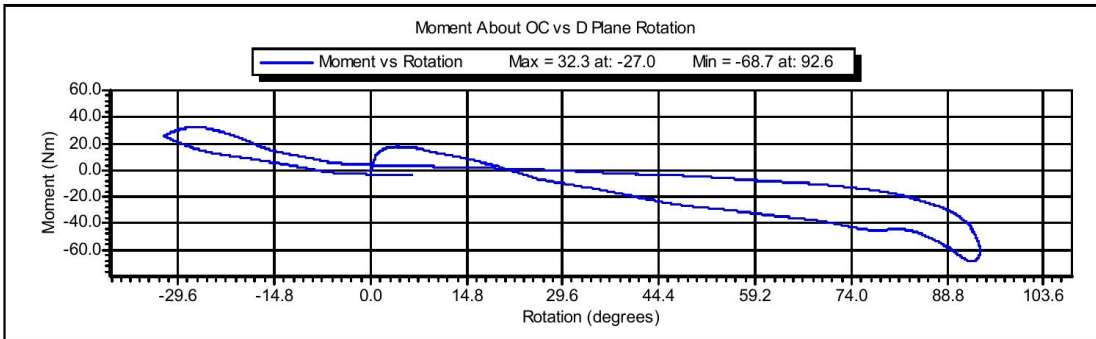


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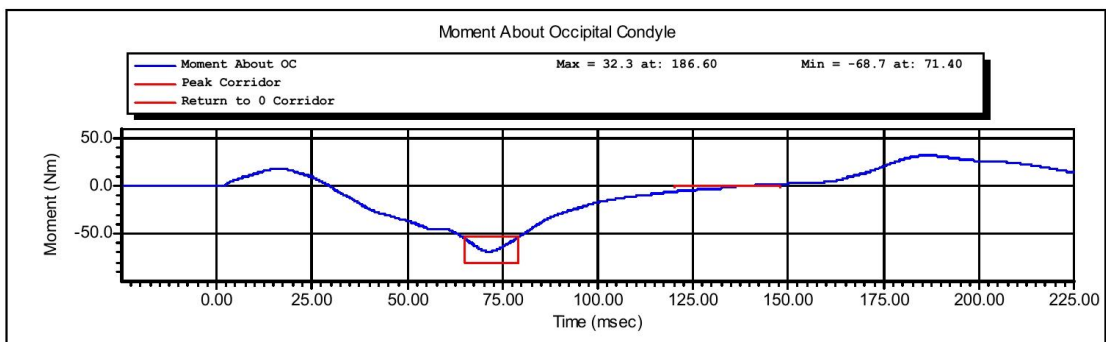
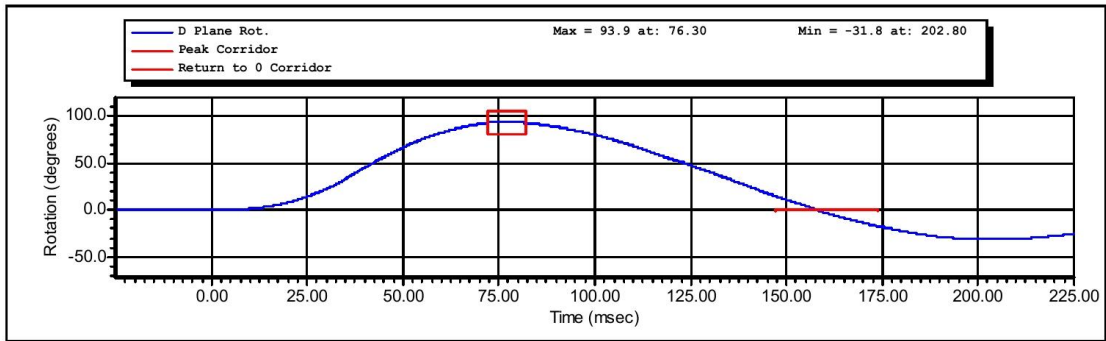
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Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:	061		
ID of Test:		Date:	2/4/2013
Number of Test:	1	Time of Test:	1:44:23 PM



Time of Test: 1:44:23 PM

Date of Test: 2/4/2013

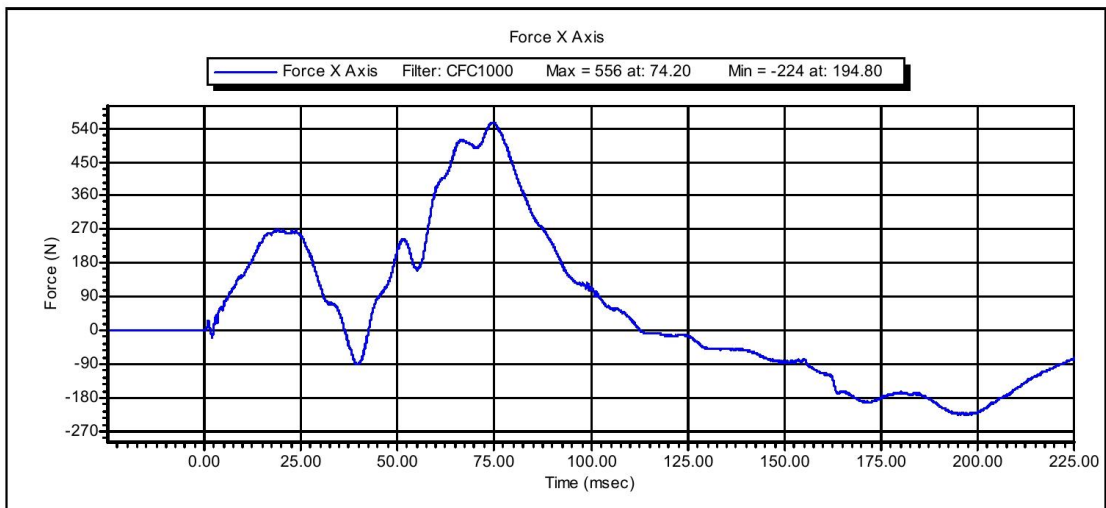
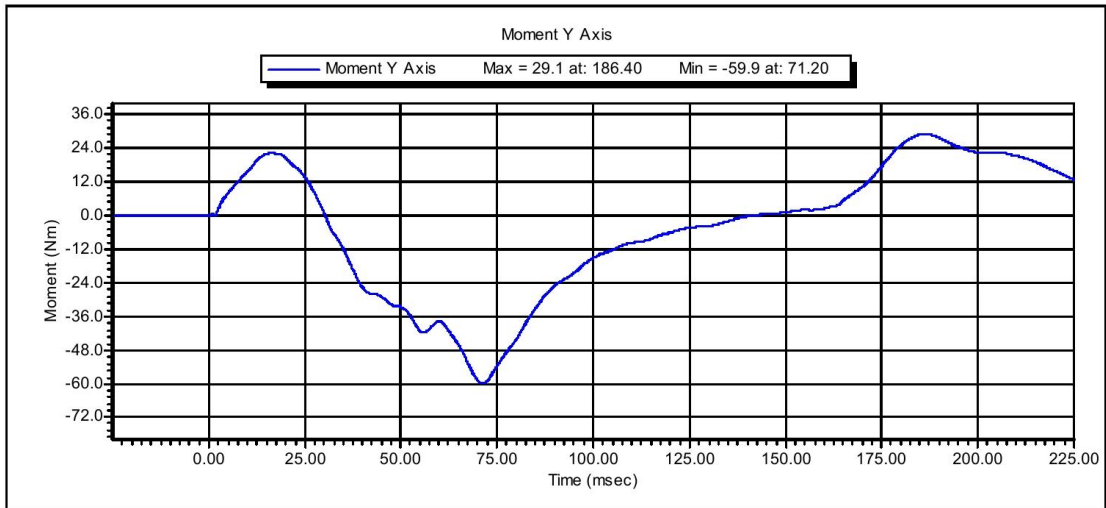
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Time of Test: 1:44:23 PM

Date of Test: 2/4/2013

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Time of Test: **1:44:23 PM**

Date of Test: **2/4/2013**

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### VERIFICATION REPORT

Test Name:	<b>Thorax Impact</b>	Revision:	<b>10/1/2001</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>Hybrid III 50'th</b>		
ATD Serial Number:	<b>061</b>		
Test ID:		Test Date:	<b>2/5/2013</b>
Test Number:	<b>1</b>	Test Time:	<b>2:08:19 PM</b>

Component Part Number	Component Serial Number
<b>Ribs 78051-RS</b>	<b>2437</b>
<b>Chest Jacket - 78051-169</b>	<b>555</b>
<b>Lumbar Spine - 78051-66</b>	

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>22.0</b> deg C P
Humidity	10.0 -- 70.0	<b>12.0</b> %RH P
Velocity	6.59 -- 6.83	<b>6.64</b> m/s P
Resistive Force	-5.894 -- -5.160	<b>-5.349</b> kN P
Sternum Displacement	-72.6 -- -63.5	<b>-71.6</b> mm P
Hysteresis	69 -- 85	<b>70</b> % P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **E. Dutton**

Test Time: **2:08:19 PM**

Test Date: **2/5/2013**

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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

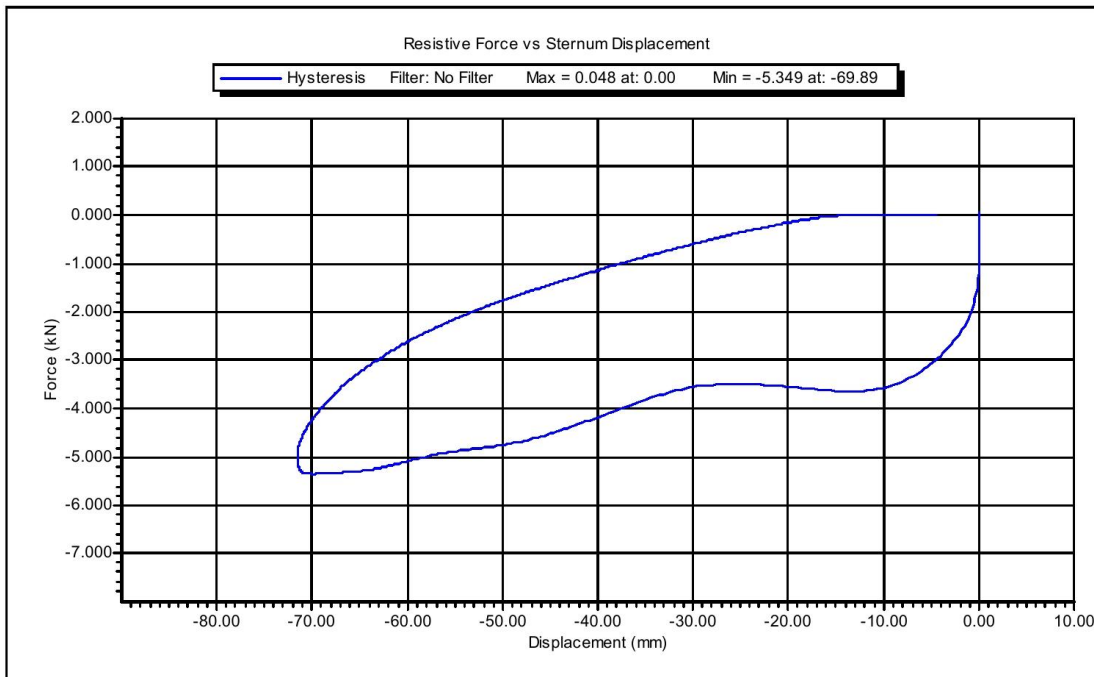
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DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	C14953	11/28/2012
DentonATD	78051-342	DS-061	5/17/2012

Test Time: 2:08:19 PM

Test Date: 2/5/2013

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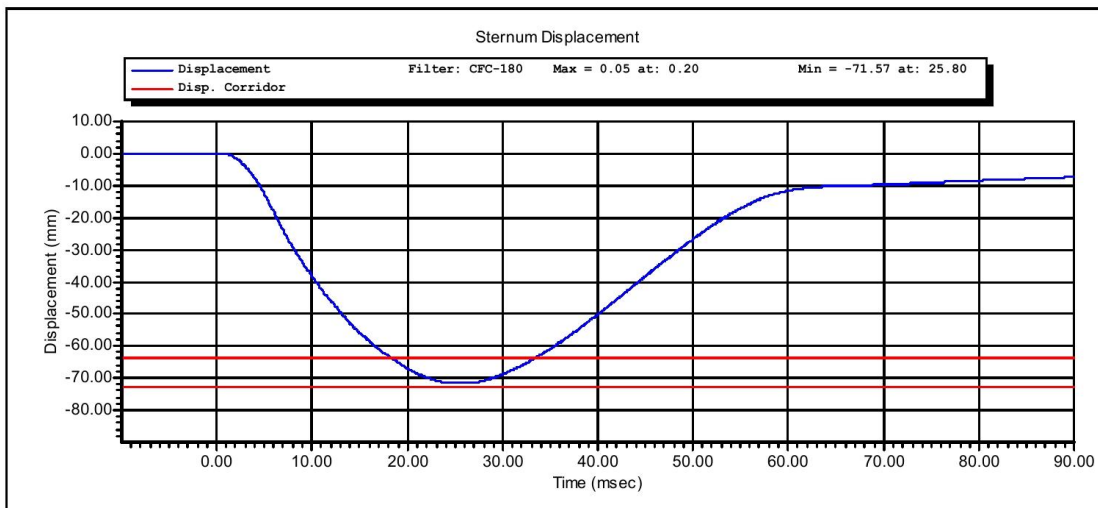
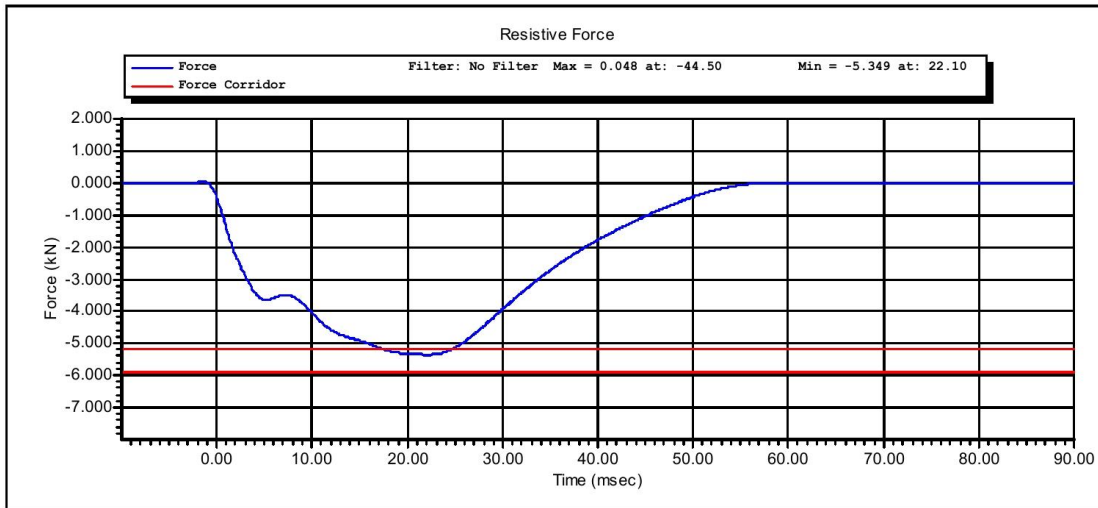
Test Name:	<b>Thorax Impact</b>	Revision:	<b>10/1/2001</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>Hybrid III 50'th</b>		
ATD Serial Number:	<b>061</b>		
Test ID:		Test Date:	<b>2/5/2013</b>
Test Number:	<b>1</b>	Test Time:	<b>2:08:19 PM</b>



Test Time: **2:08:19 PM**

Test Date: **2/5/2013**

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Test Time: **2:08:19 PM**

Test Date: **2/5/2013**

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**VERIFICATION REPORT**

Test Name:	<b>Knee Impact PENDULUM</b>	Revision:	<b>10/1/2001</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>Hybrid III 50'th</b>		
ATD Serial Number:	<b>061</b>		
Test ID:	<b>Left Knee Impact</b>	Test Date:	<b>2/4/2013</b>
Test Number:	<b>1</b>	Test Time:	<b>2:58:27 PM</b>

Component Part Number	Component Serial Number
<b>Knee Skin - 78051(L) or 6(R)</b>	<b>3268</b>

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	<b>21.0</b> deg C P
Humidity	10.0 -- 70.0	<b>13.2</b> %RH P
Velocity	2.07 -- 2.13	<b>2.10</b> m/s P
Resistive Force	-5.78 -- -4.72	<b>-5.28</b> kN P

All test parameters are within specifications

Technician: **M. Goehle**  
 Supervisor: **E. Dutton**

Test Time: **2:58:27 PM**

Test Date: **2/4/2013**



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<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	C14953	11/28/2012

Test Time: 2:58:27 PM

Test Date: 2/4/2013

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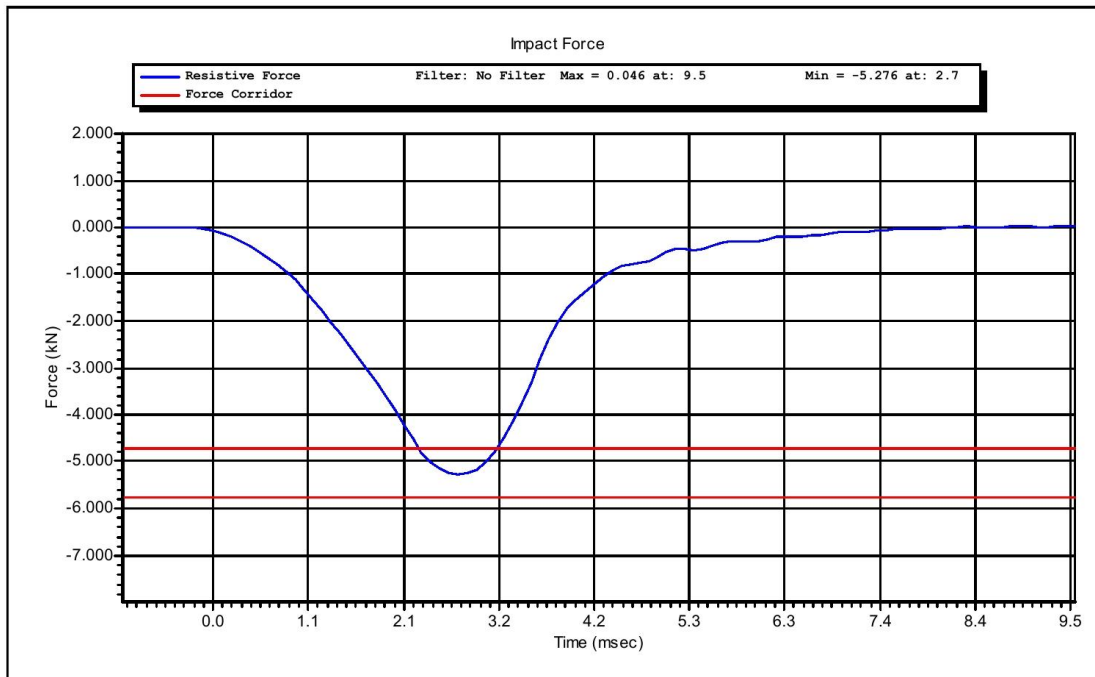


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Test Name:	Knee Impact PENDULUM	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Left Knee Impact	Test Date:	2/4/2013
Test Number:	1	Test Time:	2:58:27 PM



Test Time: 2:58:27 PM

Test Date: 2/4/2013

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Test Name:	<b>Knee Impact PENDULUM</b>	Revision:	<b>10/1/2001</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>Hybrid III 50'th</b>		
ATD Serial Number:	<b>061</b>		
Test ID:	<b>Right Knee Impact</b>	Test Date:	<b>2/4/2013</b>
Test Number:	<b>1</b>	Test Time:	<b>3:17:47 PM</b>

Component Part Number	Component Serial Number
<b>Knee Skin - 78051(L) or 6(R)</b>	<b>3158</b>

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	<b>21.0</b> deg C P
Humidity	10.0 -- 70.0	<b>13.2</b> %RH P
Velocity	2.07 -- 2.13	<b>2.10</b> m/s P
Resistive Force	-5.78 -- -4.72	<b>-5.58</b> kN P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **E. Dutton**

Test Time: **3:17:47 PM**

Test Date: **2/4/2013**

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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	C14953	11/28/2012

Test Time: 3:17:47 PM

Test Date: 2/4/2013

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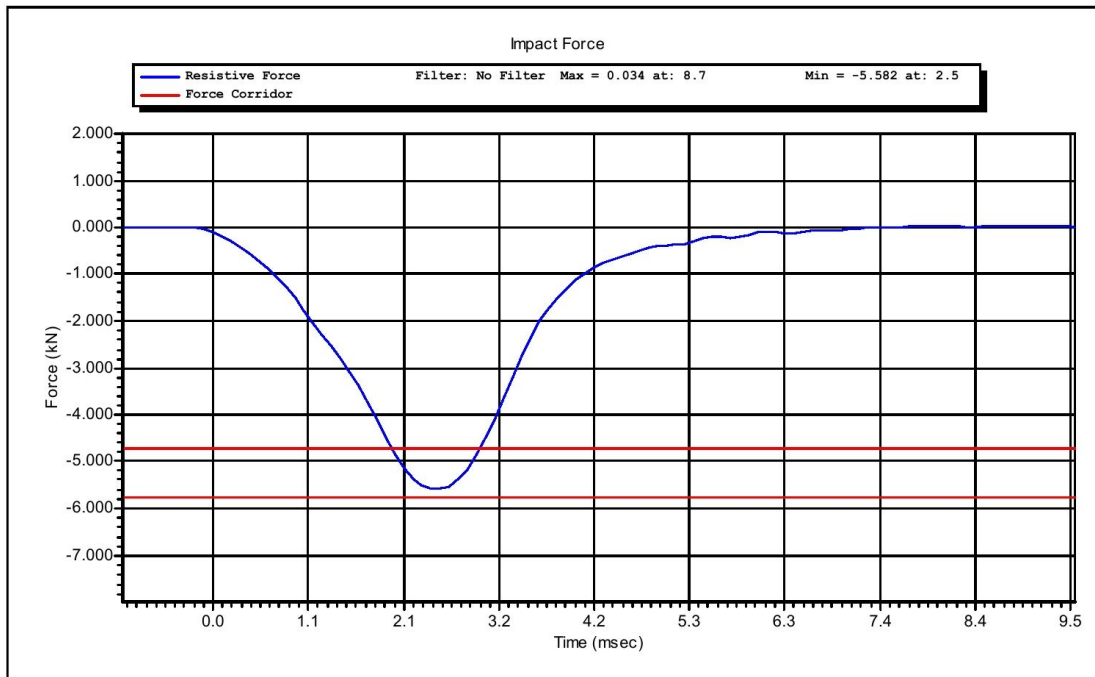


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Test Name:	Knee Impact PENDULUM	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Right Knee Impact	Test Date:	2/4/2013
Test Number:	1	Test Time:	3:17:47 PM



Test Time: 3:17:47 PM

Test Date: 2/4/2013

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**VERIFICATION REPORT**

Test Name:	<b>Hip Flexion (ROM)</b>	Revision:	<b>10/1/2001</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>Hybrid III 50'th</b>		
ATD Serial Number:	<b>061</b>		
Test ID:	<b>Left Hip ROM</b>	Test Date:	<b>2/5/2013</b>
Test Number:	<b>1</b>	Test Time:	<b>9:13:05 AM</b>

Component Part Number	Component Serial Number
<b>Pelvis Assembly 78051-60</b>	<b>2398</b>

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	<b>21.0</b> deg C P
Humidity	10 -- 70	<b>18</b> %RH P
Average Velocity	5.0 -- 10.0	<b>7.2</b> deg/s P
Angle at 203 Nm	40.0 -- 50.0	<b>38.6</b> degrees F
Moment at 30 degrees	0.0 -- 94.9	<b>84.7</b> Nm P

All test parameters are NOT within specifications

 Technician: **A. Rudniski**

 Supervisor: **E. Dutton**

 Test Time: **9:13:05 AM**

 Test Date: **2/5/2013**



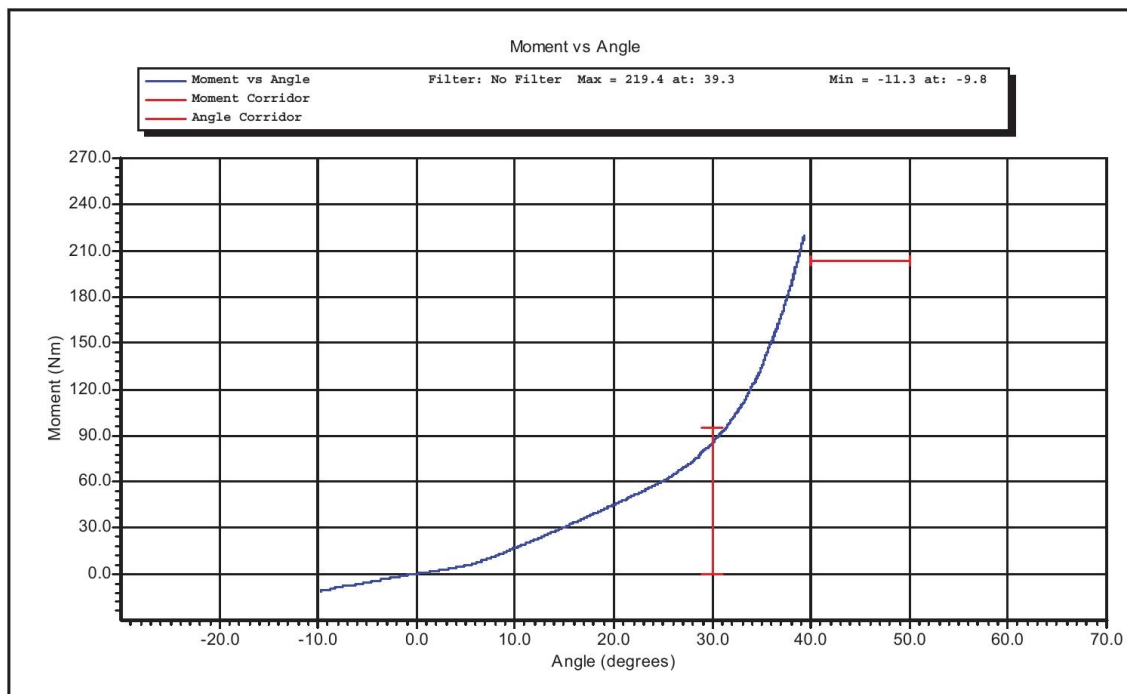
**VERIFICATION REPORT**

## REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
<b>Key</b>	<b>2301-02</b>	<b>115</b>	<b>12/15/2011</b>
<b>Transducers/PCB</b>	<b>14CB1-3615</b>	<b>0008</b>	<b>3/16/2012</b>
<b>DentonATD</b>	<b>Velocity Trap</b>	<b>1</b>	<b>1/11/2013</b>
<b>DentonATD</b>			

Test Time: **9:13:05 AM**Test Date: **2/5/2013**

Test Name:	<b>Hip Flexion (ROM)</b>	Revision:	<b>10/1/2001</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>Hybrid III 50'th</b>		
ATD Serial Number:	<b>061</b>		
Test ID:	<b>Left Hip ROM</b>	Test Date:	<b>2/5/2013</b>
Test Number:	<b>1</b>	Test Time:	<b>9:13:05 AM</b>



Test Time: **9:13:05 AM**

Test Date: **2/5/2013**

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**VERIFICATION REPORT**

Test Name:	<b>Hip Flexion (ROM)</b>	Revision:	<b>10/1/2001</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>Hybrid III 50'th</b>		
ATD Serial Number:	<b>061</b>		
Test ID:	<b>Right Hip</b>	Test Date:	<b>2/5/2013</b>
Test Number:	<b>1</b>	Test Time:	<b>10:22:18 AM</b>

Component Part Number	Component Serial Number
<b>Pelvis Assembly 78051-60</b>	<b>2398</b>

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	<b>21.1</b> deg C P
Humidity	10 -- 70	<b>19</b> %RH P
Average Velocity	5.0 -- 10.0	<b>9.6</b> deg/s P
Angle at 203 Nm	40.0 -- 50.0	<b>39.3</b> degrees F
Moment at 30 degrees	0.0 -- 94.9	<b>81.8</b> Nm P

All test parameters are NOT within specifications

Technician: **A. Rudniski**

Supervisor: **E. Dutton**

Test Time: **10:22:18 AM**

Test Date: **2/5/2013**

**VERIFICATION REPORT**

## REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Key	2301-02	115	12/15/2011
Transducers/PCB	14CB1-3615	0008	3/16/2012
DentonATD	Velocity Trap	1	1/11/2013
DentonATD			

Test Time: **10:22:18 AM**Test Date: **2/5/2013**

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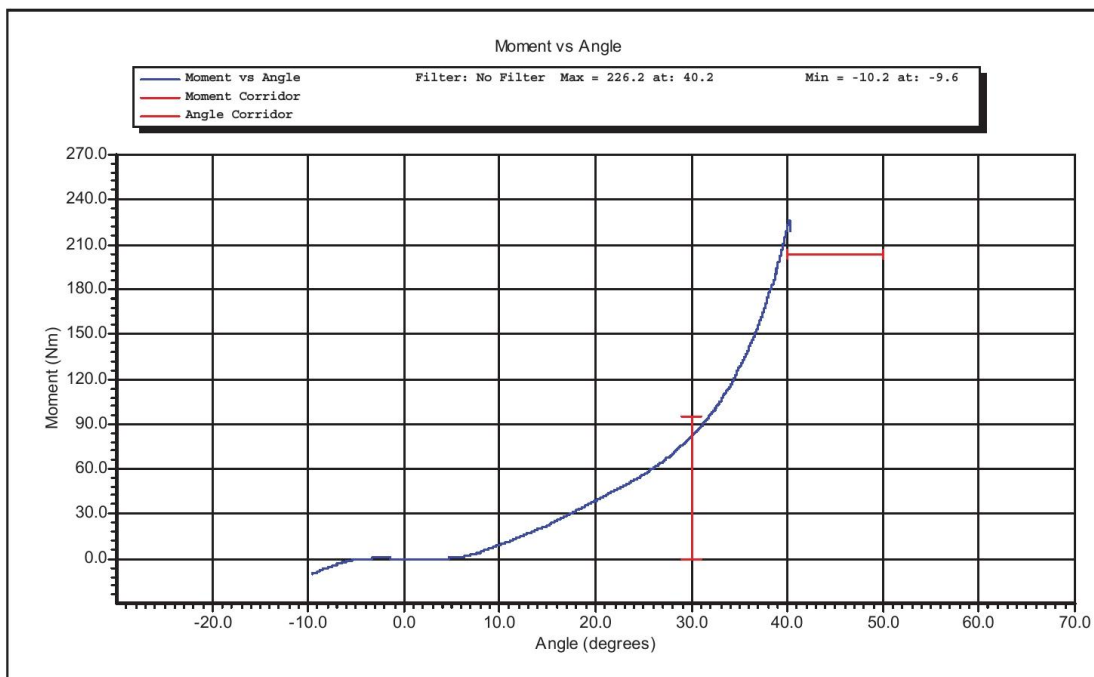


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Test Name:	Hip Flexion (ROM)	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Right Hip	Test Date:	2/5/2013
Test Number:	1	Test Time:	10:22:18 AM



Test Time: 10:22:18 AM

Test Date: 2/5/2013

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**CALIBRATION TEST RESULTS**

**POST-TEST**

**HYBRID III 5<sup>TH</sup> PERCENTILE FEMALE - PASSENGER ATD**

**SERIAL NO: 273**



## External Measurements

5<sup>th</sup> Female SN 273

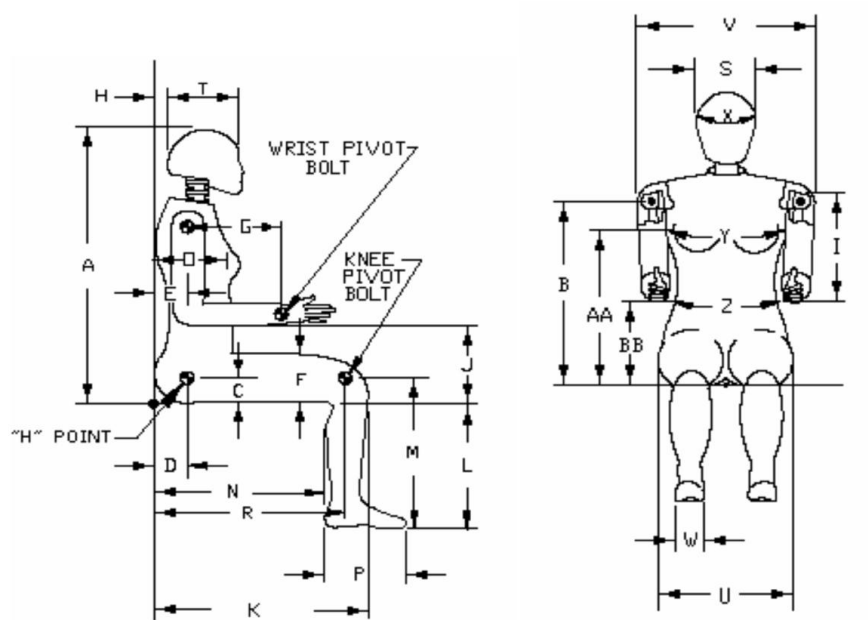
Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	774.7 – 800.1	786	Yes
B	Shoulder Pivot Height	431.8 – 457.2	451	Yes
C	H-Point Height	81.3 – 86.3	84	Yes
D	H-Point from Backline	144.8 – 149.8	146	Yes
E	Shoulder Pivot from Backline	68.6 – 83.8	76	Yes
F	Thigh Clearance	119.4 – 134.6	132	Yes
G	Back of Elbow to Wrist Pivot	243.9 – 259.1	249	Yes
H	Head Back to Backline	43.2 – 48.2	46	Yes
I	Shoulder to Elbow Length	276.8 – 297.2	286	Yes
J	Elbow Rest Height	182.8 – 203.2	194	Yes
K	Buttock to Knee Length	520.7 – 546.1	537	Yes
L	Popliteal Height	355.6 – 376	360	Yes
M	Knee Pivot Height	393.7 – 419.1	397	Yes
N	Buttock Popliteal Length	414 – 439.4	420	Yes
O	Chest Depth without Jacket	175.3 – 190.5	184	Yes
P	Foot Length (right)	218.5 – 233.7	220	Yes
R	Buttock To Knee Pivot Length	457.2 – 482.6	468	Yes
S	Head Breadth	137.1 – 147.3	143	Yes
T	Head Depth	177.8 - 188	183	Yes
U	Hip Breadth	299.7 – 314.9	310	Yes
V	Shoulder Breadth	350.5 – 365.7	357	Yes
W	Foot Breadth	78.8 - 94	82	Yes
X	Head Circumference	528.3 – 548.7	538	Yes
Y	Chest Circumference with Jacket	850.9 – 881.3	860	Yes
Z	Waist Circumference	759.5 – 789.9	771	Yes
AA	Reference Location (Chest Circumference)	332.7 – 358.1	345	Yes
BB	Reference Location (Waist Circumference)	160.1 – 170.2	165	Yes

Technician: M. Goehle

Date: 2/5/2013

# Hybrid III 5<sup>th</sup> Female External Measurements

## Reference Diagram





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### VERIFICATION REPORT

Test Name:	<b>Head Drop</b>	Revision:	<b>7/15/2002</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>Hybrid III 5'th</b>		
ATD Serial Number:	<b>273</b>		
Test ID:		Test Date:	<b>2/4/2013</b>
Test Number:	<b>1</b>	Test Time:	<b>10:59:25 AM</b>

Component Part Number	Component Serial Number
<b>Head Skin - 78051-228</b>	<b>780</b>

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	<b>21.4</b> deg C P
Humidity	10 -- 70	<b>16</b> %RH P
Resultant Acceleration	250 -- 300	<b>293</b> g P
Oscillation	0.0 -- 10.0	<b>0.0</b> % P
Lateral Acceleration	-15.00 -- 15.00	<b>2.43</b> g P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **E. Dutton**

Test Time: **10:59:25 AM**

Test Date: **2/4/2013**

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#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P52054	1/21/2013
Endevco	7264-2000	P52007	1/24/2013
Endevco	7264-2000	P51298	1/24/2013

Test Time: 10:59:25 AM

Test Date: 2/4/2013

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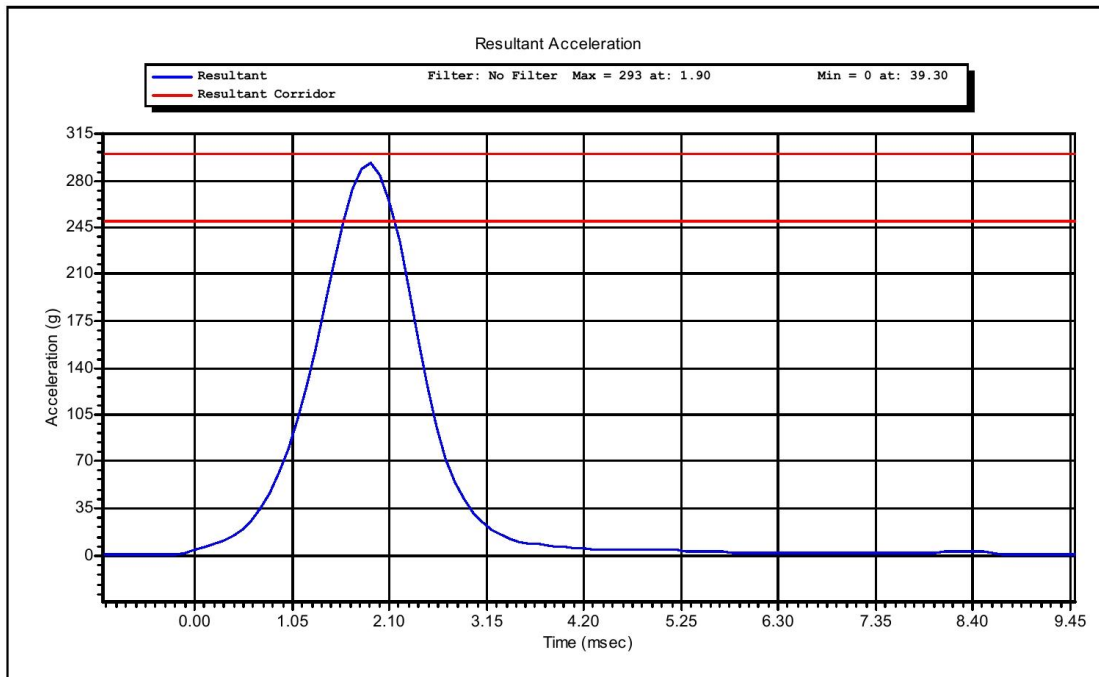


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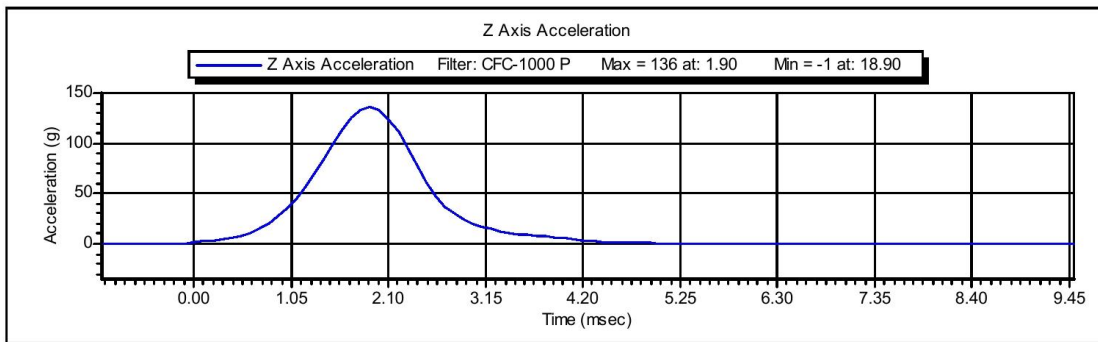
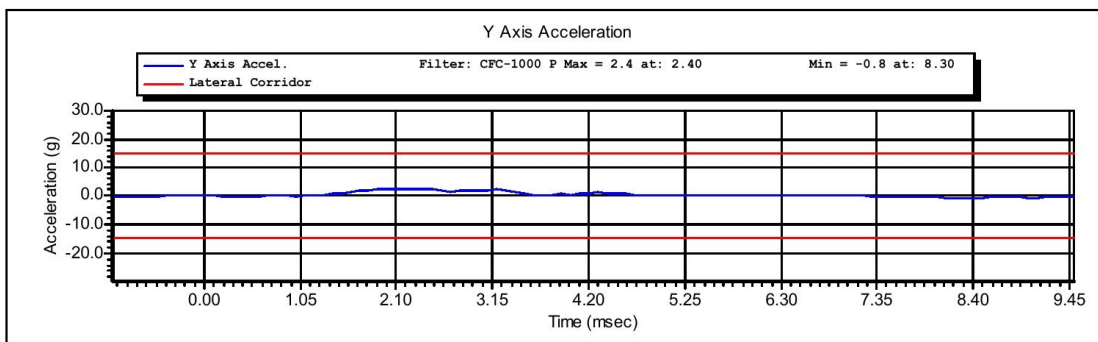
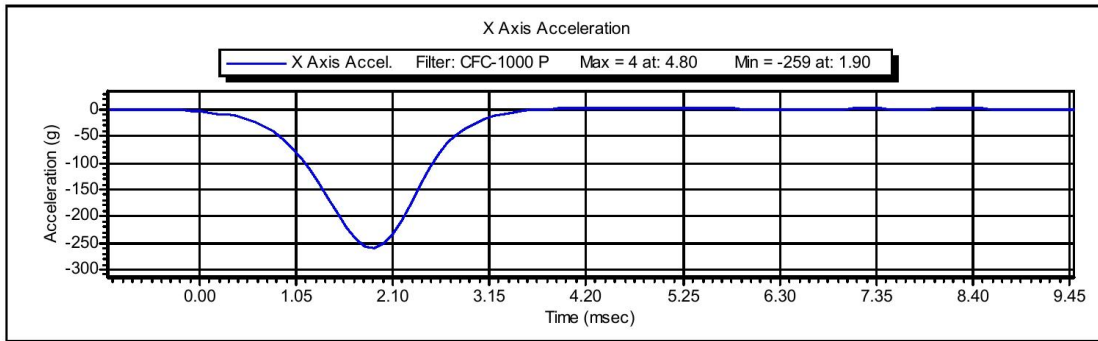
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:		Test Date:	2/4/2013
Test Number:	1	Test Time:	10:59:25 AM



Test Time: 10:59:25 AM

Test Date: 2/4/2013

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Test Time: 10:59:25 AM

Test Date: 2/4/2013

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Test Name:	<b>Neck Flexion</b>	Revision:	<b>7/15/2002</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>Hybrid III 5'th</b>		
ATD Serial Number:	<b>273</b>		
Test ID:		Test Date:	<b>2/4/2013</b>
Test Number:	<b>2</b>	Test Time:	<b>3:14:07 PM</b>

Component Part Number	Component Serial Number
<b>Neck - 880105-255</b>	<b>660</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>21.8</b> deg C P
Humidity	10 -- 70	<b>16</b> %RH P
Velocity	6.89 -- 7.13	<b>7.11</b> m/s P
Pendulum Impulse at 10 ms	2.10 -- 2.50	<b>2.32</b> m/s P
Pendulum Impulse at 20 ms	4.00 -- 5.00	<b>4.76</b> m/s P
Pendulum Impulse at 30 ms	5.80 -- 7.00	<b>6.86</b> m/s P
D Plane Rotation	-91.0 -- -77.0	<b>-83.8</b> degrees P
Moment During Rotation Interval	69.0 -- 83.0	<b>73.6</b> Nm P
Moment Decay to 10.0 Nm	80.0 -- 100.0	<b>84.7</b> ms P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **E. Dutton**

Test Time: **3:14:07 PM**

Test Date: **2/4/2013**

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#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	C15016	8/15/2012
DentonATD	78051-342	PENDULUM POT	1/25/2013
DentonATD	78051-342	CONDYLE POT	1/25/2013
Denton	1716A	LC-1629 My	5/21/2012
Denton	1716A	LC-1629 Fx	5/21/2012

Test Time: 3:14:07 PM

Test Date: 2/4/2013

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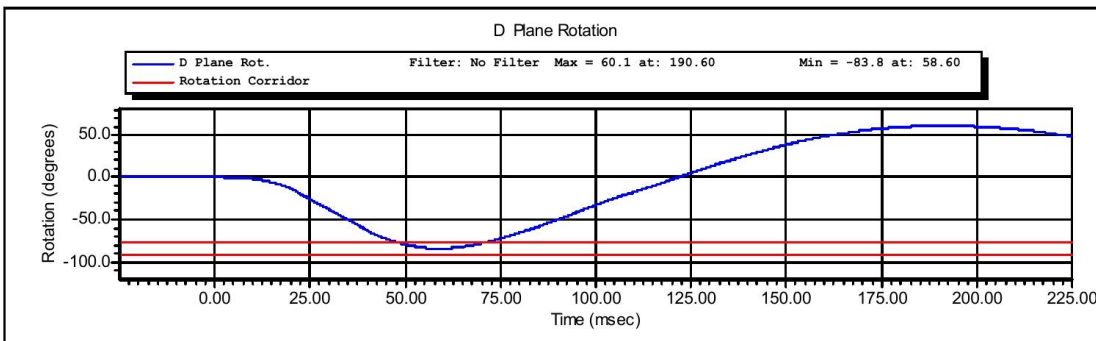
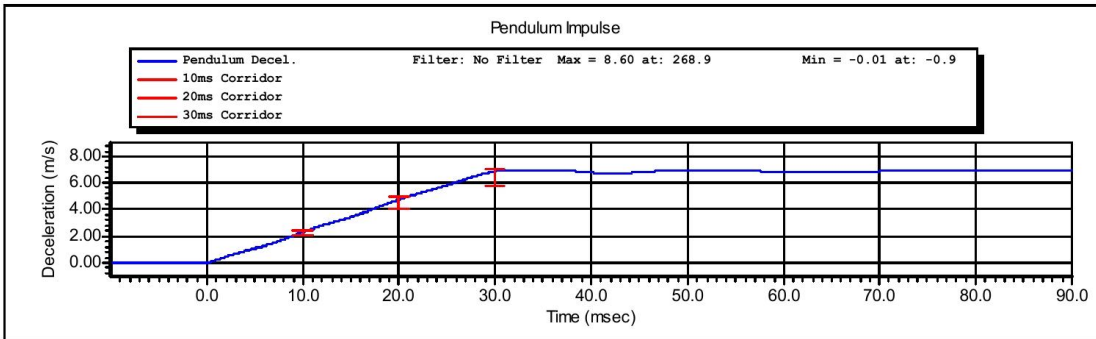


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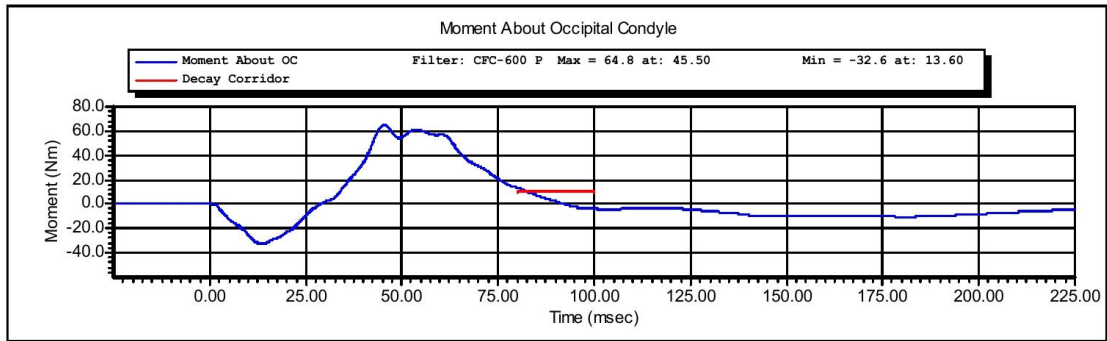
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:		Test Date:	2/4/2013
Test Number:	2	Test Time:	3:14:07 PM



Test Time: 3:14:07 PM

Test Date: 2/4/2013

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Test Time: 3:14:07 PM

Test Date: 2/4/2013

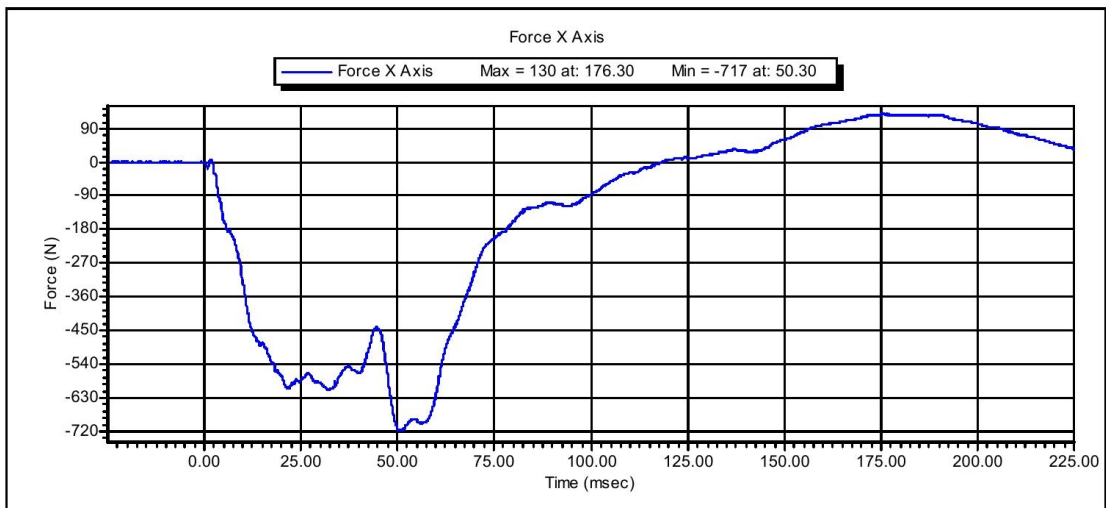
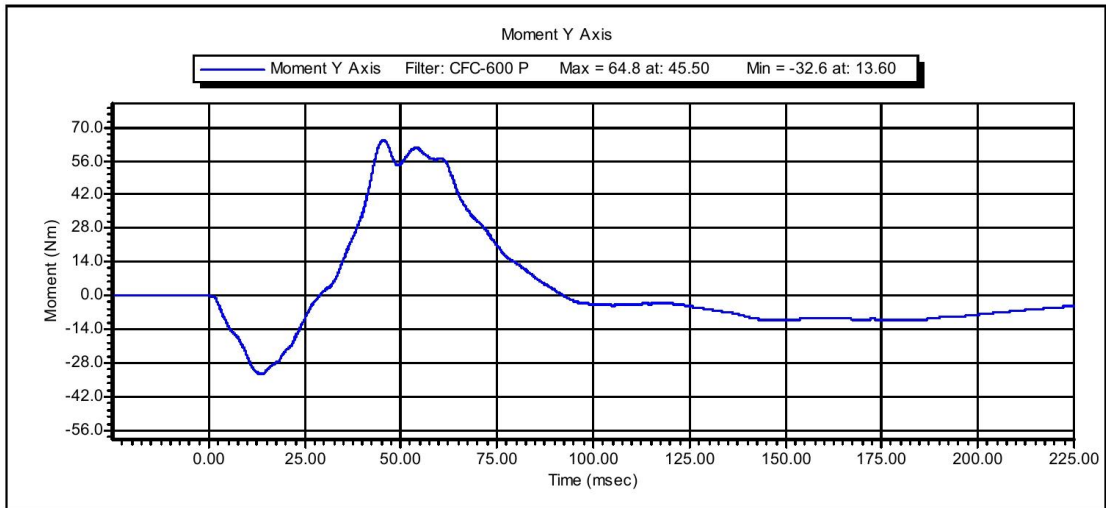
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Test Date: 2/4/2013

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Test Name:	<b>Neck Extension</b>	Revision:	<b>7/15/2002</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>Hybrid III 5'th</b>		
ATD Serial Number:	<b>273</b>		
Test ID:		Test Date:	<b>2/4/2013</b>
Test Number:	<b>2</b>	Test Time:	<b>4:20:01 PM</b>

Component Part Number	Component Serial Number
<b>Neck - 880105-255</b>	<b>660</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>21.7</b> deg C P
Humidity	10 -- 70	<b>16</b> %RH P
Velocity	5.95 -- 6.19	<b>6.12</b> m/s P
Pendulum Impulse at 10 ms	1.50 -- 1.90	<b>1.82</b> m/s P
Pendulum Impulse at 20 ms	3.10 -- 3.90	<b>3.64</b> m/s P
Pendulum Impulse at 30 ms	4.60 -- 5.60	<b>5.42</b> m/s P
D Plane Rotation	99.0 -- 114.0	<b>108.1</b> degrees P
Moment During Rotation Interval	-65.0 -- -53.0	<b>-57.5</b> Nm P
Moment Decay to -10.0 Nm	94.0 -- 114.0	<b>102.4</b> ms P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **E. Dutton**

Test Time: **4:20:01 PM**

Test Date: **2/4/2013**

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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	C15016	8/15/2012
DentonATD	78051-342	PENDULUM POT	1/25/2013
DentonATD	78051-342	CONDYLE POT	1/25/2013
Denton	1716A	LC-1629 My	5/21/2012
Denton	1716A	LC-1629 Fx	5/21/2012

Test Time: 4:20:01 PM

Test Date: 2/4/2013

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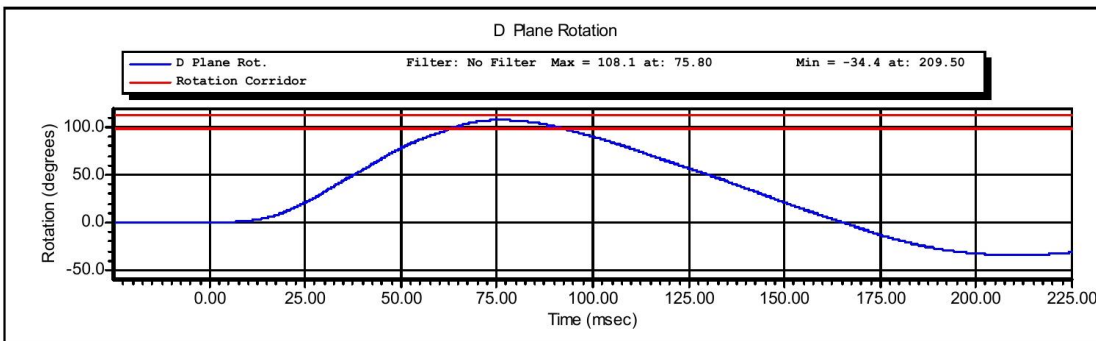
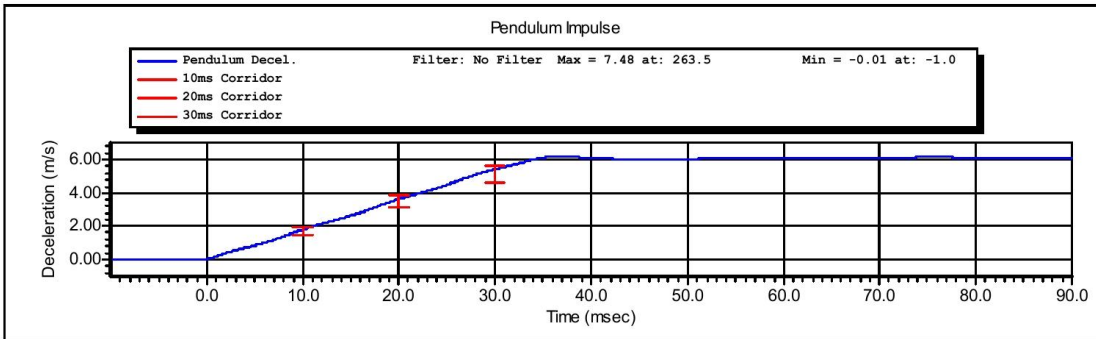


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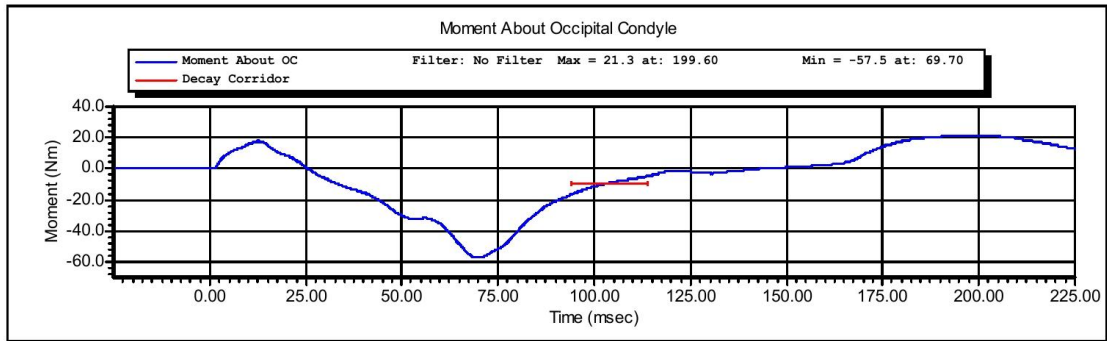
Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:		Test Date:	2/4/2013
Test Number:	2	Test Time:	4:20:01 PM



Test Time: 4:20:01 PM

Test Date: 2/4/2013

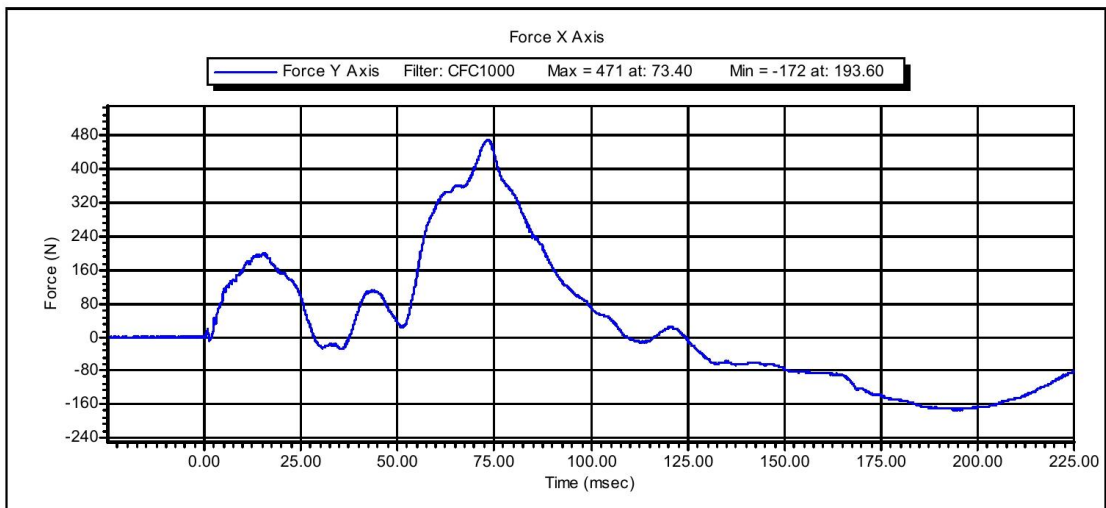
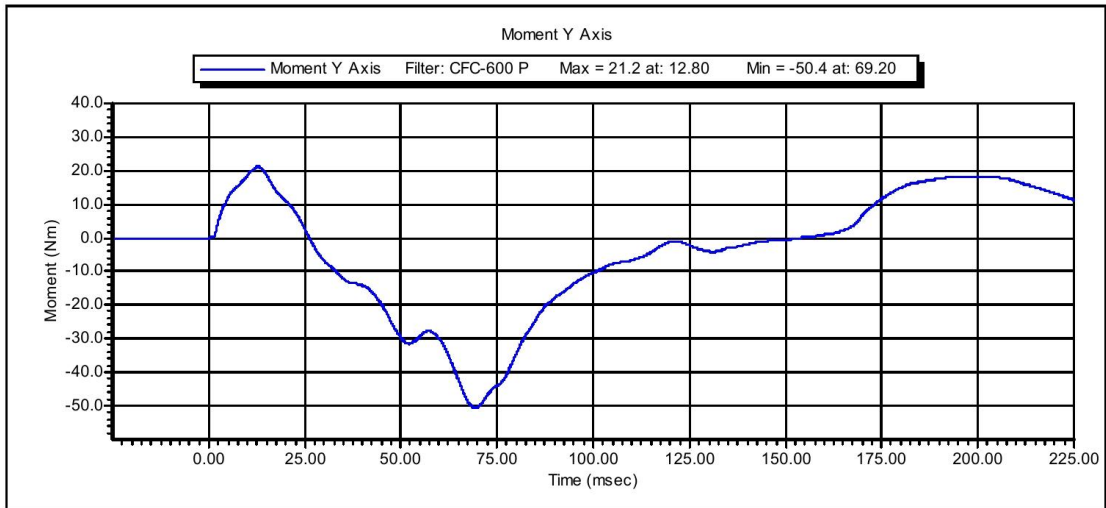
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Test Time: 4:20:01 PM

Test Date: 2/4/2013

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Test Time: **4:20:01 PM**

Test Date: **2/4/2013**

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### VERIFICATION REPORT

Test Name:	<b>Thorax Impact</b>	Revision:	<b>7/15/2002</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>Hybrid III 5'th</b>		
ATD Serial Number:	<b>273</b>		
Test ID:		Test Date:	<b>2/5/2013</b>
Test Number:	<b>1</b>	Test Time:	<b>3:08:36 PM</b>

Component Part Number	Component Serial Number
<b>Ribs 880105-RS</b>	<b>670</b>
<b>Chest Jacket - 880105-355-E</b>	<b>DH0069</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>22.0</b> deg C P
Humidity	10.0 -- 70.0	<b>12.0</b> %RH P
Velocity	6.59 -- 6.83	<b>6.64</b> m/s P
Sternum Displacement	-58.0 -- -50.0	<b>-53.5</b> mm P
Force During Displacement Interval	-4400 -- -3900	<b>-4197</b> N P
Force -18.0 to -50.0 Displacement	-4600 -- 0	<b>-4123</b> N P
Hysteresis	69 -- 85	<b>70</b> % P

All test parameters are within specifications

Technician: **A. Rudniski**  
Supervisor: **E. Dutton**

Test Time: **3:08:36 PM**

Test Date: **2/5/2013**

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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	C14953	11/28/2012
DentonATD	78051-342	DS-273	5/18/2012

Test Time: 3:08:36 PM

Test Date: 2/5/2013

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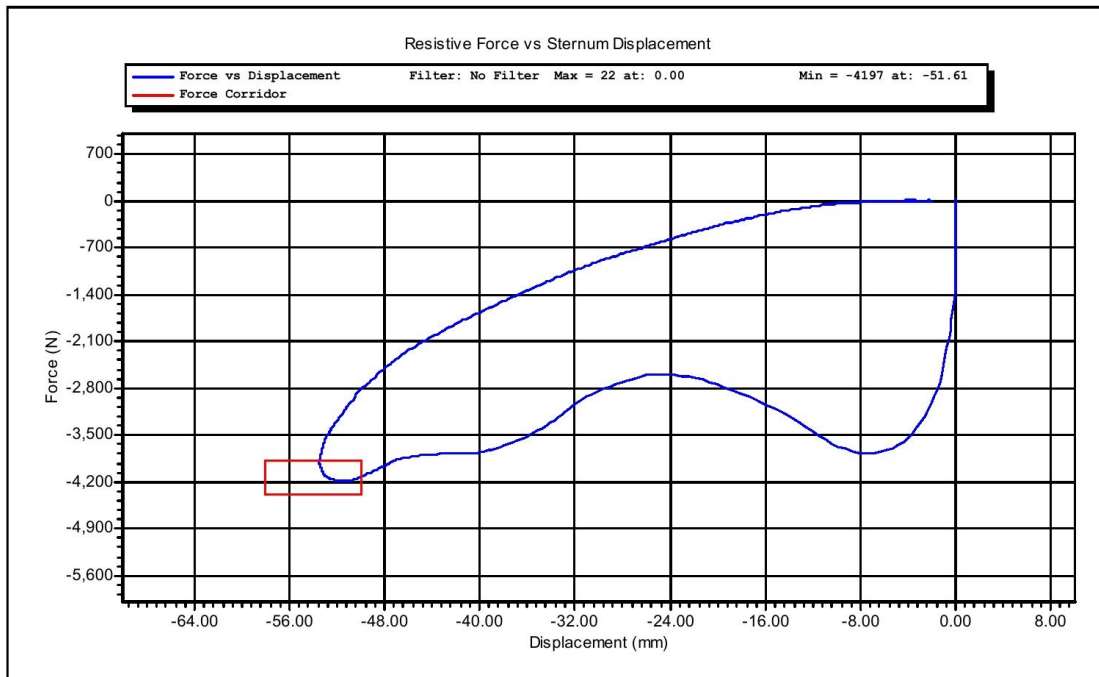


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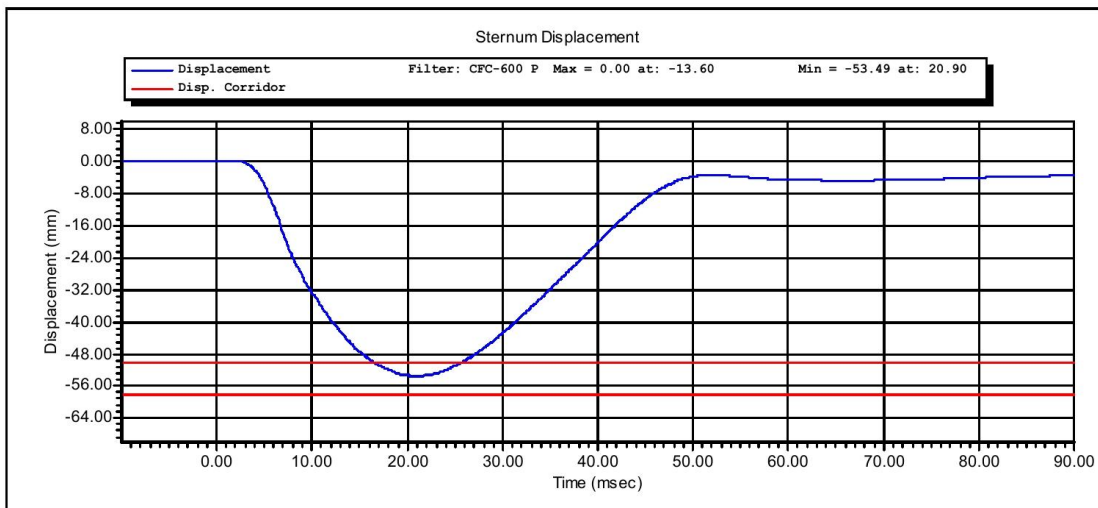
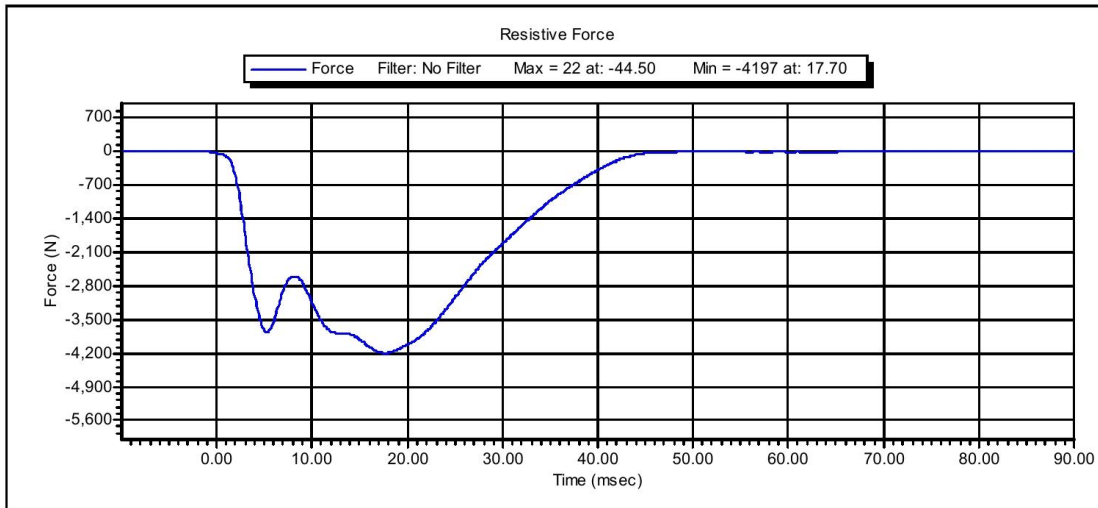
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:		Test Date:	2/5/2013
Test Number:	1	Test Time:	3:08:36 PM



Test Time: 3:08:36 PM

Test Date: 2/5/2013

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Test Time: **3:08:36 PM**

Test Date: **2/5/2013**

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**VERIFICATION REPORT**

Test Name:	<b>Knee Impact PENDULUM</b>	Revision:	<b>7/15/2002</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>Hybrid III 5'th</b>		
ATD Serial Number:	<b>273</b>		
Test ID:	<b>Left Knee Impact</b>	Test Date:	<b>2/4/2013</b>
Test Number:	<b>1</b>	Test Time:	<b>2:18:10 PM</b>

Component Part Number	Component Serial Number
<b>Knee Skin - 880105-508</b>	<b>1726</b>
<b>Knee Insert - 880105-511</b>	<b>1039</b>

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	<b>21.0</b> deg C P
Humidity	10.0 -- 70.0	<b>13.1</b> %RH P
Velocity	2.07 -- 2.13	<b>2.11</b> m/s P
Resistive Force	-4060 -- -3450	<b>-3979</b> N P

All test parameters are within specifications

Technician: **M. Goehle**  
Supervisor: **E. Dutton**

Test Time: **2:18:10 PM**Test Date: **2/4/2013**



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#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	C14953	11/28/2012

Test Time: 2:18:10 PM

Test Date: 2/4/2013

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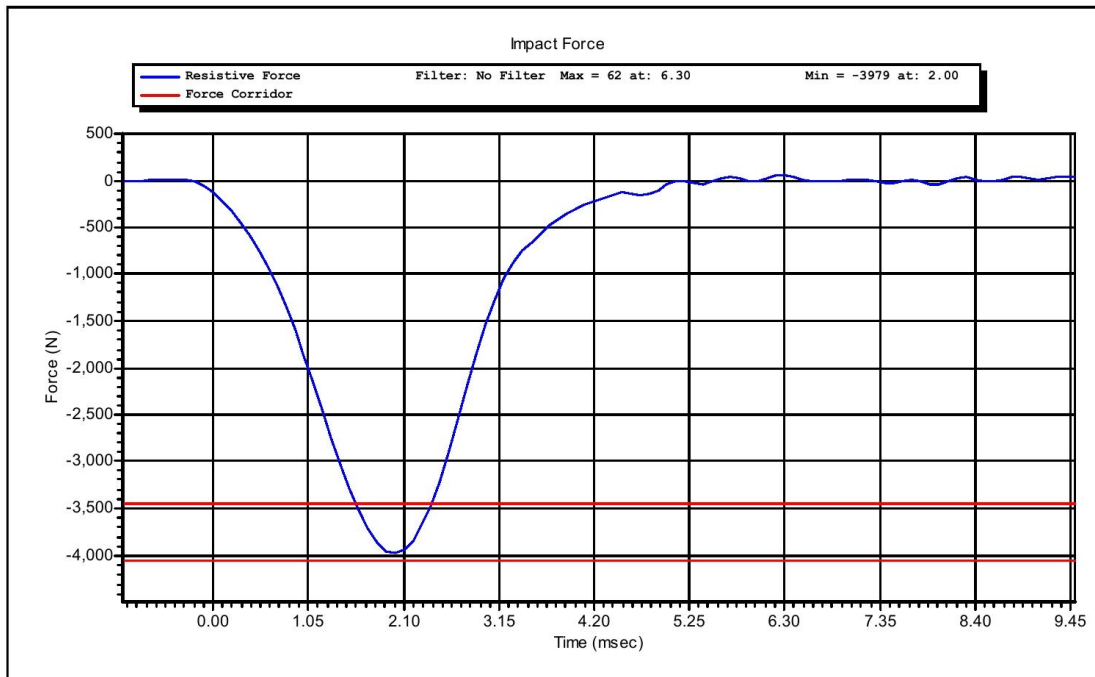


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Test Name:	Knee Impact PENDULUM	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Left Knee Impact	Test Date:	2/4/2013
Test Number:	1	Test Time:	2:18:10 PM



Test Time: 2:18:10 PM

Test Date: 2/4/2013

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### VERIFICATION REPORT

Test Name:	<b>Knee Impact PENDULUM</b>	Revision:	<b>7/15/2002</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>Hybrid III 5'th</b>		
ATD Serial Number:	<b>273</b>		
Test ID:	<b>Right Knee Impact</b>	Test Date:	<b>2/4/2013</b>
Test Number:	<b>1</b>	Test Time:	<b>2:35:02 PM</b>

Component Part Number	Component Serial Number
<b>Knee Skin - 880105-508</b>	<b>1051</b>
<b>Knee Insert - 880105-511</b>	<b>1038</b>

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	<b>21.0</b> deg C P
Humidity	10.0 -- 70.0	<b>13.8</b> %RH P
Velocity	2.07 -- 2.13	<b>2.10</b> m/s P
Resistive Force	-4060 -- -3450	<b>-3932</b> N P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **E. Dutton**

Test Time: **2:35:02 PM**

Test Date: **2/4/2013**

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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	C14953	11/28/2012

Test Time: 2:35:02 PM

Test Date: 2/4/2013

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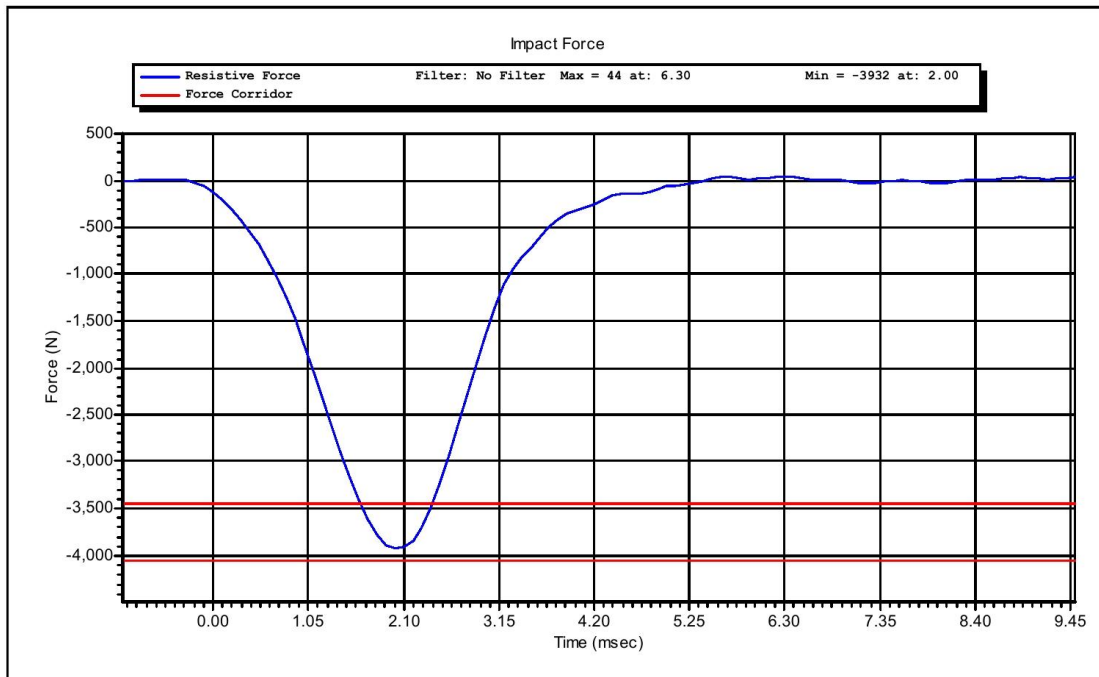


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Test Name:	<b>Knee Impact PENDULUM</b>	Revision:	<b>7/15/2002</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>Hybrid III 5'th</b>		
ATD Serial Number:	<b>273</b>		
Test ID:	<b>Right Knee Impact</b>	Test Date:	<b>2/4/2013</b>
Test Number:	<b>1</b>	Test Time:	<b>2:35:02 PM</b>



Test Time: **2:35:02 PM**

Test Date: **2/4/2013**

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## Torso Flexion

### Pre-Test

#### Part 5720 HIII 5% Female

ATD Serial No: 273

Laboratory Supervisor: E. Dutton

Date: 2-5-2013

Laboratory Technician: M Goehle

TEST PARAMETER	SPECIFICATION	TEST RESULTS	STATUS
Lab Temperature:	18.9-25.6 C	21.0 C	Passed
Lab Humidity:	10-70 %	19.00 %	Passed
Initial Angle:	0.00-20.00 Deg	19.51 Deg	Passed
Force at 45 Deg	320.00-390.00 N	384.06 N	Passed
Return Angle	8 Deg Max from Initial	24.46 Deg	Passed

## LUMBAR SPINE FLEXION TEST

